AMERICAN
JOURNAL OF PSYCHIATRY

ENCEPHALOGRAPHIC STUDIES IN GENERAL PARESIS.*

By FRANKLIN G. EBAUGH, M. D., HENRY H. DIXON, M. D., HUGH E. KIENE, M. D., and KENNETH D. ALLEN, M. D.,

DENVER, COLORADO.

The development and improvement in technique of encephalography [1] appears to offer an important and safe approach to the study of the character and degree of brain changes in general paresis. Patients with general paresis apparently are ideal subjects for this clinical procedure, especially as the unfavorable after effects of encephalography are not as marked as in other cases of intracranial pathology.

In using the method of encephalography to study cases of general paresis, we had the following objects in view:

1. To study the best method and technique for encephalography as well as the characteristic objective and subjective findings associated with this operation.

2. To see if there is a correlation between encephalographic findings and clinical findings in general paresis.

3. To make a comparison of encephalographic findings after non-specific therapy with studies made before non-specific therapy.

4. To use as a control, the encephalographic findings in committed, deteriorated cases of general paresis who have not responded to non-specific therapy, as well as studies in other organic brain diseases.

---

* Read at the eighty-sixth annual meeting of The American Psychiatric Association, Washington, D. C., May 6, 7, 8, 9, 1930. From the University of Colorado Psychopathic Hospital.

47

METHOD AND TECHNIQUE.

Clinical.—We used the method devised by one of us (Dixon) consisting of a closed displacement system in which the two spinal needles are inserted one segment apart in the second and third lumbar interspaces. Several minutes are allowed for recovery from the shock of insertion of the needles, then the feeder tube leading through the spinal manometer into the depth tube in the graduate is attached to the lower lumbar needle. The graduate is turned on the side in position horizontal to the floor. The outlet tube is held until the feeder tube is full of fluid and then attached to the upper lumbar needle. The graduate is then turned into an upright position and lowered as far as the tube will permit. (Fig. 1.) The flow of spinal fluid is allowed to continue until the air comes back from the feeder tube. Movements of the head facilitate the flow of fluid towards the end of the operation. In all cases care is taken to replace with air the total volume of fluid drained from the patient. Manometer readings of spinal fluid pressure and tracings of blood pressure, pulse and respirations are taken at regular intervals during the removal of the fluid. (See Fig. 1.) This apparatus has many points of similarity to the one devised by Liberson.[2] We, however, have used two needles in preference to one as we believe the flow is smoother, since alterations in the height of the apparatus in comparison with the height of the needle level will alter the speed of flow. We also believe this method will insure less shock for the patient.

In the routine examinations in this clinic, cerebrospinal fluid pressure readings are made in the horizontal position on all patients on admission. Encephalography is, therefore, performed only on proven paretics whose cerebrospinal fluid pressure has previously been recorded.

Roentgenological Technique.—We advise the following technique which our experience leads us to believe is the most efficient and which we have used in the majority of the cases presented. The general plan is adapted from that described by Pendergrass.[3]

The erect sitting posture is essential to insure symmetrical distribution of the air. A small Bucky diaphragm, erected perpendicularly in such a way that it can be moved up and down sufficiently to accommodate patients of different size and also permit

the patient's knees to protrude underneath, is essential for clear radiographs. (See Fig. 2.)

Head braces such as are used in nasal accessory sinus x-ray examinations greatly facilitate immobility and alignment, a binder being reserved for intractable patients.

Stereoscopic pairs are beautiful and interesting but not essential. An antero-posterior posterior view is so sure to be complicated by distorted frontal sinuses that an extra plate made in the antero-posterior anterior position with a different angle, as described later, affords more information and saves one manœuvre of the patient. Therefore, the essential plates, are four in number, one with each side of the head next to the Bucky and two with the face to the Bucky diaphragm.

The distance of fifty inches which we recommend prevents undue distortion even of the posterior horns thus obviating the necessity of the occipital position.*

In the lateral view the side of the head is placed with the horizontal central line of the Bucky passing along the eyebrow and the perpendicular line of the Bucky surface through the external auditory meatus. The antero-posterior position is obtained by placing the patient's forehead and nose on the face of the Bucky with the glabella at the center. One plate is made with a ten degree downward slant of the tube; then without moving the patient, another with the tube slanted ten degrees upward.

The central ray should be passed through the center of the Bucky for all positions.

Every effort should be made to prevent rotation of the head so that the anterior and posterior horns of the lateral ventricles are equidistant from the front and back of the head respectively as seen in the lateral view and not super-imposed in any portion in the antero-posterior view.

Lateral inclination causing one lateral sinus to appear a little higher than the other on the plate instead of being undesirable, probably is advantageous and therefore no time need be lost endeavoring to prevent lateral inclination.

* However, the observations of Adolf Meyer indicate that asymmetry of the posterior horn is frequently present. We should consider these variations in the interpretation of encephalograms.

The factors which give the best detail and contrast are as follows: Distance 50 inches; milliamperage 100; approximately 64 kv. for lateral and 74 kv. for antero-posterior; time 4 seconds. In the few cases for which the time is too long to prevent movement it can be cut with a proper increase in kilo-voltage.

Removal of the filter in a partly darkened room will facilitate centering, especially of the slant views. It can then be replaced before exposure or left out if amount of exposure to the patient is carefully checked.

We feel that the upward slant insures that the frontal sinuses are thrown clear of the third ventricle and lateral ventricles.

In several cases in which the downward slant was used, air outlining the insular region on both sides has been noted. Also the dilated lateral projections of the cisterna vena magna are better identified. A change in angulation in the antero-posterior view offers a better visualization of inter-hemispheric air.

Plates of the lateral position, centered as described, have shown the pons, cerebellum, upper surface of the corpus-callosum, inferior surface of the frontal lobe, in addition to the structures more commonly visualized.

One more important point concerning x-ray technique; if a patient is given the x-ray examination immediately following the air introduction he will give much more cooperation than at a later time.

OBJECTIVE AND SUBJECTIVE FINDINGS.

We were very much impressed with the general lack of severe reactions following encephalography in cases of general paresis. The reactions appear to be more severe where the encephalographic findings approximate those of the normal. This apparently is on the same basis as the well-known observation that cases of general paresis rarely develop lumbar puncture headaches after extensive drainage. Well-advanced cases rarely showed headaches, whereas headache was the most common reaction encountered in the group as a whole. On the basis of the characteristically poor vascular tone in general paresis we anticipated more collapse reactions than actually occurred. The vomiting appeared to be associated with movements of the head towards the end of the operation and may

possibly indicate irritative phenomena in the ventricles due to fluid level. Collapse reactions did occur at the end of the operation and in five cases there was a sustained rapid fall in blood pressure, and alarming symptoms leading to complete syncope developed. These patients, however, responded immediately to stimulation with caffeine and adrenalin and later showed no untoward effects. No deaths directly attributable to encephalography have occurred in this series although in one advanced case of paresis death from broncho-pneumonia occurred ten days following this operation. Table I illustrates the type of reactions noted and represents composite objective and subjective data kept on each patient during the operations.

On the basis of the findings in the above table we do not feel that intraspinous air injections should be considered as an unjustifiably radical procedure. It is of interest to note that subjectively many of the patients indicate improvement following this operation.

ANALYSIS OF ENCEPHALOGRAPHIC FINDINGS.

We have performed encephalography on 70 patients for a total of 97 injections. This group includes 16 deteriorated cases who have previously had malaria treatment and have been committed to the state hospital and are now living.* The remaining group of cases are paretics admitted routinely to the psychopathic hospital. Many of these are early cases of short duration although deteriorated cases are included. It has been our policy [8] in this hospital to group these cases into the following clinical classifications:

Group A, representing cases who show definite and characteristic findings of advanced mental deterioration. In these cases advanced parenchymatous changes have occurred.

Group B, organic reactions with psychosis of functional coloring. This group includes cases of general paresis in which therapy may possibly arrest the pathological processes and restore the patient for either transient or permanent periods. The psychosis

* We wish to express our indebtedness to Dr. F. H. Zimmerman, Superintendent of the Colorado State Hospital at Pueblo, and to his staff, for their courtesy in providing us with this material.

TABLE I.

OBJECTIVE AND SUBJECTIVE SYMPTOMS DURING INJECTION OF AIR.

This table represents composite findings. The most common time for severe symptoms is near the end of the injection. When a severe or shock reaction occurs we discontinue injection and administer stimulants. We notice with sphygmomanometer and pulse records that when movements of the head are made, marked changes occur in pulse and blood pressure and the patients complain of headaches, nausea, and show diffuse perspiration. In deteriorated cases there is often no reaction.

Reaction.	Number of patients.	Encephalograms.	Blood pressure variations.	Pulse variations.	Subjective and objective symptoms.
Shock	5	8	Below 40 systolic.......	Below 50. Above 140.....	Syncope, thready pulse, etc. Rapid respirations, incontinence—particularly true of Type C.
Severe	8	12	Below 50 systolic.......	Below 55. Above 120.....	Profuse sweating, severe headaches, nausea, vomiting, cyanosis, twitchings. Seen more frequently in Type B or Type C.
Moderate	31	41	Below 60 systolic. 40 mm. Hg. above normal.	Between 55 and 65 or to 120.	Sweating, headaches, nausea, restlessness, agitation, dopey, oppression in head. More frequent in Type A or Type B.
Slight	20	28	Fluctuating. 10-20 mm. Hg.	Fluctuating. 10-20	Slight headaches, feeling sick all over, moaning, pain in back. More frequent in Type A and occasionally in Type B.
None	6	8	Fluctuating. Less than 10 mm. Hg.	Fluctuating. Less than 10.	Few complaints. Particularly true of Type A.
Total	70	97			

simulates the functional disturbances seen in the manic excitements and the depressions as well as other functional reaction types.

Group C, transitory psychoses without signs of deterioration. This group includes delirious reactions and neurological irritative phenomena on the basis of exacerbated meningovascular and endarteritic disease.

Table II gives a summary of the encephalographic findings in Group A paretics. This group includes 16 cases of committed paretics who are still living.

These findings, on the whole, indicate an obliteration of the cortical cerebrospinal fluid pathways, especially in the frontal and parietal areas with dilatation of the basal cisternæ. Apparently there has been a damming up of cerebro-spinal fluid over the cortex in these areas. This obliteration of the cortical spinal fluid pathway has been termed an " arachnoiditis " pattern. ("Arachnoiditis " is an x-ray term. We later describe our understanding of its significance.) (Fig. 3.) In other cases atrophic areas appear to be combined with " arachnoiditis," or an attempt at reduplication of cortical fluid pathways may be seen. (Figs. 4, 5, 6.) Our clinical classification into the three groups enumerated above offers us a possible correlation with encephalographic findings. This is especially significant in the study of 16 cases of advanced paresis which have been committed to the state hospital. One of these cases is now living after seven years institutionalization. Likewise, in encephalograms of Group A paretics, we more frequently see intrahemispheric air. In several cases, marked atrophy in the insular area is noted.

In the interpretation of the encephalograms in paretics of the clinical Group B classification similar findings to those described in the deteriorated cases were noted. However, in general the areas of cortical atrophy appear to be less marked as well as the " arachnoiditis." These represent the cases that are more favorable for non-specific treatment. Characteristic encephalographic patterns for this group are summarized in Table III. (Figs. 7A, 7B.)

In the clinical Group C classification the encephalographic findings can be summarized as shown in Table IV.

TABLE II.

Type A—General Paresis.

ENCEPHALOGRAPHIC FINDINGS.

Name Hosp. No.	Age	Sex	Type	Cc. of air	Enlargement of ventricles	Arachnoiditis	Cortical atrophy	Enlargement of basal cisternæ	Fluid level	May 1, 1930, clinical status	Prognosis	Malaria
State Hospital Cases.												
W. C. S. H. 4	40	M	A	60	Injection incomplete.	Marked	Slight left frontal and parietal. Occipital air.	Not visualized	None	Unimproved. State Hospital.	Poor	After. 6/14/26.
J. D. S. H. 16	38	F	A	158	Moderate	Moderate	Marked inf. frontal. Moderate parietal and insular.	Not visualized	None	Unimproved. State Hospital.	Poor	After. 6/14/26.
E. D. S. H. 18	44	M	A	110	Partly filled.	Moderate	Moderate frontal and parietal.	Not visualized	Yes	Unimproved. State Hospital.	Poor	After. 3/26/27.
O. D. S. H. 2	48	M	A	195	Not shown	None	Marked frontal and parietal. Air in left vertex.	Moderate. C. V. M.	None	Unimproved. State Hospital.	Poor	After. 6/24/28.
P. H. S. H. 11	42	F	A	100	Distortion posterior horn.	Marked left. Moderate right.	Moderate frontal and parietal. Irregular areas air left parietal.	Moderate	Yes	Unimproved. State Hospital.	Poor	After. 8/23/28.
P. H. S. H. 14	51	F	A	130	Marked	None	Moderate right frontal. Air over vertex, more on right. Dural attachments visualized. Moderate intrahemispheric.	Moderate	None	Unimproved. State Hospital.	Poor	After. 5/8/28.
E. L. S. H. 1	39	M	A	65	Slight. Left larger.	Moderate right.	Left moderate frontal and parietal. Air in occipital region.	Moderate	Yes	Unimproved. State Hospital.	Guarded.	After. 7/26/29.
A. K. S. H. 5	46	M	A	60	Not shown. Injection incomplete.	Marked	Not visualized	Moderate C. V. M.	None	Unimproved. State Hospital.	Poor	After. 1/13/29.
N. M. S. H. 10	41	F	A	222	Moderate	None	Marked frontal, parietal and intrahemispheric.	Not visualized	None	Unimproved. State Hospital.	Poor	After. 7/14/29.
Z. O. S. H. 15	43	F	A	95	Not well shown.	Marked	Moderate insular, Sylvian fissure, occipital air. No frontal or parietal.	Not visualized	Yes	Unimproved. State Hospital.	Poor	After. 2/17/29.
G. P. S. H. 3	47	M	A	160	Moderate	Marked left. Moderate right.	Marked right frontal parietal, occipital and insular. Air in right vertex. Irregular parietal areas.	Moderate	None	Unimproved. State Hospital.	Poor	After. 12/30/27.

areas.

TABLE II.—Continued.
Type A—General Paresis.
Encephalographic Findings.

Name Hosp. No.	Age	Sex	Type	Cc. of air.	Enlargement of ventricles.	Arachnoiditis.	Cortical atrophy.	Enlargement of basal cisternæ.	Fluid level.	May 1, 1930, clinical status.	Prognosis.	Malaria.
State Hospital Cases.												
E. S. S. H. 17	45	M	A	65	Moderate right. Unilateral. Distortion anterior horn.	Marked	Moderate left parietal. Moderate frontal.	Moderate	Yes	Improved. State Hospital.	Poor	After. 1/18/29.
H. S. S. H. 12	40	F	A	117	Not shown	None	Moderate frontal and parietal.	Moderate C. V. M.	None	Unimproved. State Hospital.	Poor	After. 7/18/29.
C. S. S. H. 13	46	F	A	220	Slight distortion.	None	Marked air in vertex. Occipital air. Moderate intrahemispheric. Dural attachments visualized.	Moderate C. V. M.	None	Unimproved. State Hospital.	Poor	After. 6/14/28.
T. T. S. H. 6	47	M	A	110	Marked. Third and fourth. Distortion. Left larger.	Marked	Moderate left parietal.	Moderate	None	Unimproved. State Hospital.	Poor	After. 1/27/29.
L. F. S. H. 7	49	M	A	100	Not visualized.	Marked	Marked frontal and parietal.	Moderate	None	Unimproved. State Hospital.	Poor	Before.
				110	Small amount of air.	Moderate	Marked left frontal and parietal. Irregular areas air left parietal.	Moderate	Yes			After. 4/15/27.
Psychopathic Hospital Cases.												
P. P. 2279	58	M	A	60	Marked. Injection incomplete.	Marked	Not visualized	Not visualized	Yes	Unimproved. State Hospital.	Poor	Before.
H. J. 3147	52	M	A	100	Marked	Marked	Not visualized	Moderate	Yes	Died of hemorrhage during malaria.	Died	Before.
H. M. 3207	48	M	A	135	Marked	Marked	Moderate frontal and parietal. Large atrophic areas.	Moderate	None	Died during malaria.	Died	Before.
E. R. 3316	48	M	A	210	Marked	Marked	Few compensatory pathways.	Moderate	None	Died nephritis and kidney atrophy.	Died	Before.

TABLE II.—Continued.
TYPE A—GENERAL PARESIS.
ENCEPHALOGRAPHIC FINDINGS.

Name Hosp. No.	Age	Sex	Type	Cc. of air	Enlargement of ventricles	Arachnoiditis	Cortical atrophy	Enlargement of basal cisternæ	Fluid level	May 1, 1930, clinical status	Prognosis	Malaria
Psychopathic Hospital Cases.												
R. S. 3683	37	M	A	230	Marked	Marked	Moderate parietal and frontal and right insular.	Marked	None	Unimproved. In hospital.	Poor	Before.
W. T. 1737	41	M	A	100	Marked	Marked	Slight frontal	Moderate	Yes	Died, ten days after injection.	Died	Before.
W. S. 1813	47	M	A	210	Marked, third, and fourth.	Marked	Not visualized	Moderate	None	Died of G. P. 4/16/30.	Died	Before.
F. G. 3556	54	M	A	120	Moderate	Marked	Not visualized	Moderate	None	Improved. In hospital.	Poor	Before.
				150	Moderate	Moderate left	Moderate parietal and frontal. Areas of air right parietal. Moderate insular.	Moderate	None			After—1 mo.
				180	Marked	None	Marked air throughout cortex. Occipital air.	Moderate	None			After—2 mo.
				120	Marked. Reduplication of fluid pathways.	None.	Free air in vertex. Occipital air. Marked frontal and parietal.	Moderate C. V. M.	None			After—3 mo.
S. M. 3142	37	M	A	160	Area filled with air in vertex. Nothing else visualized.				None	Improved. Not working.	Poor	Before.
				200	Marked right.	Moderate	Not visualized	Moderate	Yes			Before.
				230	Marked distortion.	Moderate	Moderate parietal	Moderate	None			After—2 mo.
				140	Marked distortion.	Marked	Not visualized	Moderate	Yes			After—3 mo.
				200	Marked distortion.	Moderate	Not visualized	Moderate	None			After—4 mo.

Atrophy present on both sides if not otherwise noted.   Abbreviations: Inf.—Interior.   C. V. M.—Cisterna Vena Magna.

746

TABLE III.

TABLE III.

Type B—General Paresis.

ENCEPHALOGRAPHIC FINDINGS.

Name Hosp. No.	Age	Sex	Type	Cc. of air	Enlargement of ventricles	Arachnoiditis	Cortical atrophy	Enlargement of basal cisterna	Fluid level	May 1, 1930, clinical status	Prognosis	Malaria
F. A. 3380	50	M	B	130	Moderate. Fourth.	Moderate	Moderate frontal, parietal and intrahemispheric. Parietal and occipital air, irregular.	Moderate	Yes	Improved. Working.	Good	Before.
				100	Marked	Slight	Moderate frontal and intrahemispheric. Slight insular. Vertex air.	Moderate	Yes			After—1 mo.
R. C. 3356	18	M	B	100	Moderate	Marked	Not visualized	Moderate	Yes	Improved. Working.	Good	Before.
				100	Moderate	Slight, right. Clear left.	Slight right frontal and parietal.	Moderate	Yes			After—1 mo.
				50	Injection incomplete.							After—2 mo.
				65	Injection incomplete.							After—3 mo.
				40	Injection incomplete.							After—4 mo.
W. P. 2116	56	M	B	110	Moderate. Left larger. Distortion.	Moderate	Slight frontal. Moderate intrahemispheric. Corpus callosum?	Mdoerate	Yes	Improved. Incomplete remission.	Guarded	Before.
				150	Moderate. Distortion.	Less	Moderate left frontal and parietal.	Moderate	None			After—3 mo.
M. R. 3343	50	M	B	75	Marked	Marked	Not visualized	Not visualized	Yes	Improved. State Hospital.	Guarded	Before.
				110	Marked. Distortion right.	Moderate	Moderate frontal and parietal.	Slight	Yes			After—3 mo.
J. T. 3306	31	M	B	190	Marked	Marked right. Moderate left.	Not visualized	Moderate	None	Improved. Working.	Fair	Before.
				180	Marked	Improved, slightly.	Marked left frontal. Air in right vertex.	Moderate	None			After—1 mo.
				120	Posterior horn?	None	Vertex air. Dural attachments visualized.	Not visualized	None			After—3 mo.
F. H. 3180	31	M	B	130	Moderate. Third.	Moderate	Slight parietal, insular, frontal, and inferior frontal.	C. V. M.	None	Improved. Organic residual.	Fair	Before.
				120	Moderate	None	More marked parietal, frontal, insular, and inferior frontal.	Moderate	None			After—1 mo.
P. L. 3281	36	M	B	130	Moderate	Moderate	Slight left frontal and parietal. Air left vertex.	Moderate	None	Improved. Working.	Good	Before.

TABLE III.—Continued.

General Paresis.

ENCEPHALOGRAPHIC FINDINGS.

Name Hosp. No.	Age.	Sex.	Type.	Cc. of air.	Enlargement of ventricles.	Arachnoiditis.	Cortical atrophy.	Enlargement of basal cisterne.	Fluid level.	May 1, 1930, clinical status.	Prognosis.	Malaria.
P. L.	36	M	B	120	Moderate	Moderate left.	Marked left frontal and parietal. More air left vertex.	Slight	None ..			After—2 mo.
P. H. 3381	45	M	B	150	Moderate	Marked	Marked left frontal......	Slight	None	Improvide. State Hospital.	Fair ...	Before.
				130	Moderate left.	Moderate	Moderate left frontal. Right vertex air.	Moderate	Yes			After—1 mo.
M. K. 3252	42	F	B	130	Moderate	Moderate	Moderate parietal	Slight	None	Improved. In hospital.	Guarded.	Before.
				90	Moderate	Slight	Slight frontal and intrahemispheric. Marked parietal.	Slight	Yes			After—1 mo.
				110	Moderate	Slight right...	Marked left parietal and frontal.	Slight	Yes			After—2 mo.
				100	Appear very small.	None	Marked left parietal. Air right vertex, irregular.	Slight	Yes			After—3 mo.
P. H. 3567	45	M	B	120	Incompletely filled.	Moderate	Moderate frontal and intrahemispheric. Vertex air, more left. Dural attachments visualized.	Moderate	Yes	Improved. Working.	Good ..	Before.
				130	Moderate left.	None	Moderate frontal, parietal and intrahemispheric.	Moderate	Yes			After—1 mo.
E. Mc. ... 3464	42	F	B	100	Moderate. Fourth.	Marked	Moderate inferior frontal and insular.	Slight	None	Improved.	Fair ...	Before.
				120	Moderate.	Marked	Slight insular	Moderate	None ..	Not working.		After—1 mo.
				120	Moderate. Fourth.	Marker	Slight insular	Marked	None ..			After—2 mo.
J. G. 1829	38	M	B	95	Moderate	None	Moderate frontal and parietal.	Not visualized	Yes	Improved. Working.	Good ...	After—1 yr.
G. G. 2501	37	M	B	125	Moderate	Moderate	Moderate parietal and insular.	Not visualized	Yes	Improved. Working.	Guarded.	After—2 mo.
J. H. 3106	43	M	B	120	Moderate. Fourth.	Moderate	Slight insular. Right vertex air.	Moderate	None	Died. Respiratory.	Died ...	Before.
E. L. 1119	44	M	B	120	Normal	None	Irregular parietal areas of air.	Not visualized	None ..	Improved. Working.	Fair ...	After—1 yr.
J. P. 3019	48	M	B	135	Normal	None	Marked frontal and parietal. Left vertex air.	Not visualized	None ..	Improved. Working.	Good ...	After—3 mo.
H. C. 3704	30	M	B	110	Moderate	None	Moderate frontal and parietal.	Not visualized	None ..	Being treated...	Fair ...	Before.

748

TABLE III.—Continued.

GENERAL PARESIS.

ENCEPHALOGRAPHIC FINDINGS.

Name Hosp. No.	Age.	Sex.	Type.	Cc. of air.	Enlargement of ventricles.	Arachnoiditis.	Cortical atrophy.	Enlargement of basal cisterna.	Fluid level.	May 1, 1930, clinical status.	Prognosis.	Malaria.
K. R. 3816	40	M	B	130	Slight	Slight	Not visualized	Not visualized	Yes	Being treated	Fair	Before.
D. B. 3666	50	M	B	120	Right unilateral. Third. Injection incomplete.	Moderate	Moderate parietal, frontal and insular.	Moderate	None	Improved. In hospital.	Good	Before.
T. M. 1459	45	M	B	45	Not visualized	Moderate	Moderate parietal	Moderate	None	Improved. Working.	Good	Before.
J. R. .... C. G. H.	40	M	B	100	Slight	Slight	Slight frontal	Not visualized	None	Being treated	Fair	Before.
B. S. 1695	41	M	B	120	Moderate	None	Marked frontal and parietal. Left vertex air.	Moderate	None	Improved. Working.	Good	After—1 mo.
H. F. 2717	33	M	B	135	Moderate	Moderate	Not visualized	Not visualized	Yes	Improved. Working.	Fair	After—1 mo.
M. M. 3418	32	M	B	75	Slight	None	Marked frontal and parietal.	Moderate	None	Improved. State Hospital.	Fair	Before.
J. D. 3624	60	M	B	130	Injection incomplete. Slight. Third.	Slight	Slight frontal	Moderate	None	Working. Improved.	Good	Before.
H. S. 1058	30	M	B	65	Slight. Third.	Slight	Slight frontal	Moderate	None	Not working. Improved.	Guarded.	After—6 mo.
R. B. 270	38	M	B	75	Moderate. Fourth.	Marked	Slight parietal	Moderate	None	Improved. Working.	Good	Before.
E. B. 909	37	F	B	100	Slight	Moderate	Slight frontal. Right parietal air.	Moderate C. V. M.	None	Improved. Working.	Good	After—2 yr.
E. S. 1885	51	F	B	130	Slight	Moderate	Slight frontal, parietal and right insular. Air right parietal.	Not visualized	None	Improved. Working.	Good	After—1½ yr.
E. B. 3723	34	M	B	110	Slight	Moderate	Slight parietal and frontal. Intrahemispheric and right insular. Air left vertex and right parietal.	Moderate	None	Under treatment.	Fair	Before.
N. H. 3740	29	M	B	130	Moderate	Slight	Slight parietal and frontal.	Moderate	Yes	Under treatment.	Good	Before.
W. N. 2066	56	M	B	110	Not visualized	Moderate	Moderate frontal and parietal.	Moderate	Yes	Improved. Working.	Fair	After—2 mo.
H. D. 3663	39	F	B	50	Incomplete injection. Slight.					Improved. Working.	Fair	Before.
G. T. 2617	42	M	B	105	Left larger.	Slight	Slight frontal	Not visualized	None	Improved. Working.	Good	Before.
F. G. 3370	46	M	B	40	Incomplete injection.					Improved. In hospital.	Fair	Before.

Atrophy present on both sides if not otherwise noted.
Abbreviations: C. V. M.—Cisterna Vena Magna.

TABLE IV.

Type C—General Paresis.

ENCEPHALOGRAPHIC FINDINGS.

Name Hosp. No.	Age.	Sex.	Type.	Cc. of air.	Enlargement of ventricles.	Arachnoiditis.	Cortical atrophy.	Enlargement of basal cisternae.	Fluid level.	May 1, 1930, clinical status.	Prognosis.	Malaria.
H. B. 2662	37	M	C	130	Slight	None	Slight frontal and parietal.	Moderate. Pons visualized.	None	Recovered. Working.	Good	After—6 mo.
G. B. 3176	43	M	C	130	Moderate. Left larger.	Slight	Slight frontal. Air in right vertex.	Not visualized.	None	Recovered. Working.	Good	After—2 mo.
W. C. 3489	53	M	C	100	Normal	Slight, right.	Slight left frontal and parietal.	Not visualized	Yes	Recovered. Working.	Good	Before.
W. H. 3268	42	M	C	110	Not filled	Slight	Slight frontal and parietal. Air right vertex.	Moderate. C. V. M.	None	Recovered. Working.	Good	Before.
A. J. 3637	37	M	C	60	Normal. Fourth.	Moderate	Not visualized	Moderate	Yes	Improved. Under treatment.	Good	Before.
M. J. 3549	43	M	C	100	Slight	None	Slight frontal and parietal and intrahemispheric. Air in left vertex.	Not visualized	None	Improved. Under treatment.	Good	Before.
H. Mc. 1154	31	M	C	120	Slight	Slight	Slight frontal	Moderate	None	Recovered. Working.	Good	After—1 yr.
H. H. 3235	52	M	C	60	Slight. Third and fourth. Injection incomplete.	None	Slight insular and frontal. Air left parietal irregular.	Not visualized.	Yes	Improved. Working.	Good	After—1 mo.
W. S. 3416	43	M	C	130	Normal	Moderate	Moderate frontal	Not visualized	None	Improved. Working.	Good	Before.
J. S. 3284	32	M	C	55	Slight. Injection incomplete.	None	Slight frontal	Not visualized.	Yes	Improved. Working.	Good	After—2 mo.

Atrophy present on both sides if not otherwise noted.
Abbreviations: C. V. M.—Cisterna Vena Magna.

750

Fig. 8 is an illustrative encephalogram of this group. Here we see many cortical markings and patchy "arachnoiditis" with moderate dilatation of the ventricles.

COMPARISON OF ENCEPHALOGRAMS BEFORE AND AFTER MALARIA TREATMENT.

Encephalographic studies were made before and after malaria treatment in fourteen cases. This constituted the most interesting group in our study. Three of this group had five successive encephalograms each, at intervals of approximately one month beginning after malaria treatment. The most striking encephalographic pattern shown after malaria therapy consisted in the clearing up of "arachnoiditis" manifest before malaria treatment in three cases. The malaria treatment apparently has released the obstructing factor in the cerebrospinal fluid pathways so that full drainage with wider areas of fluid release has occurred over the cortex. In this release there has been a decrease in the dilatation of the basal cisternæ present before malaria, as shown in Fig. 9. Our encephalographic findings seem to indicate that the atrophy and increase in cortical pathways was present before the malaria therapy, but was not demonstrable either because of the fluid which had been caught in the meshes of the arachnoid or due to a generalized edema. These studies throw some illumination upon the nature of cortical atrophy in paresis. The following encephalograms are illustrative of this group (Figs. 10A and B, 11A and B).

DISCUSSION.

Our experience in this group of 70 cases of general paresis in which 97 encephalograms were performed indicates that this operation in careful hands is a safe clinical procedure. Severe reactions did occur but in the majority of cases only moderate reactions occurred. On the basis of our studies it is our impression that a reasonable correlation between clinical status and the degree of cortical involvement can frequently be reached. The encephalographic findings in 25 cases of general paresis placed in the deteriorated Group A are in accord with the unsatisfactory results in the treatment of this group studied previously. Apparently the marked arachnoiditis and the pressure atrophy in these cases is

extremely advanced although new fluid pathways are often reopened by malaria therapy.

"Arachnoiditis" is an x-ray term used to describe the smooth ground glass appearance of the brain as seen in some x-ray plates. The condition of the brain which gives rise to this appearance is probably best explained by the pathologic examination of the brain of a patient dying during the active stage of the disease when the "arachnoiditis" pattern was well marked. Grossly, there was smoothing of the meninges which were held away from the cortical structure by pockets of fluid and inflammatory products. The pia was thickened and edematous. This collection of fluid and the thickened pia covered areas of brain atrophy which had developed during the course of the disease, due to the failure of drainage had not shown in the x-ray. The blocking can readily be accounted for by the inflammatory process resulting from the disease.

Solomon and Taft[6] describe the histopathology of general paresis as showing perivascular infiltration, pial infiltration, pial edema, ameboid glial cells and plasma cells. They quote Alzheimer as saying that no case of general paresis exists without pial changes and that marginal gliosis exists to a greater or less degree. McIntosh and Fildes[7] describe an acute reaction of the parenchymatous and interstitial tissues which occurs during the progress of the disorder. These changes are undoubtedly sufficient to cause a blocking of the normal conduction pathways of the spinal fluid. Fay and Winkelman[8] have also noted changes in the pacchionian corpuscles which they feel limit the absorption of the spinal fluid. This factor, with the blocking, they believe to be responsible for pressure atrophy which is due to the dammed up fluid. The encephalographic findings indicate that in many cases where the fluid pathways which were previously blocked in areas over the cortex are reestablished through malaria treatment, allowing for collection of air at the vertex and the filling of fluid channels and pockets. This indicates that one result of non-specific therapy has been to reduce the process responsible for the blocking. Here again the related pathology gives possible explanation. Solomon and Taft state that the infiltrative and edematous process has been decreased using the plasma cell count as criterion. McIntosh and Fildes say that in improved cases the result is due to "a resolution of associated interstitial syphilis."
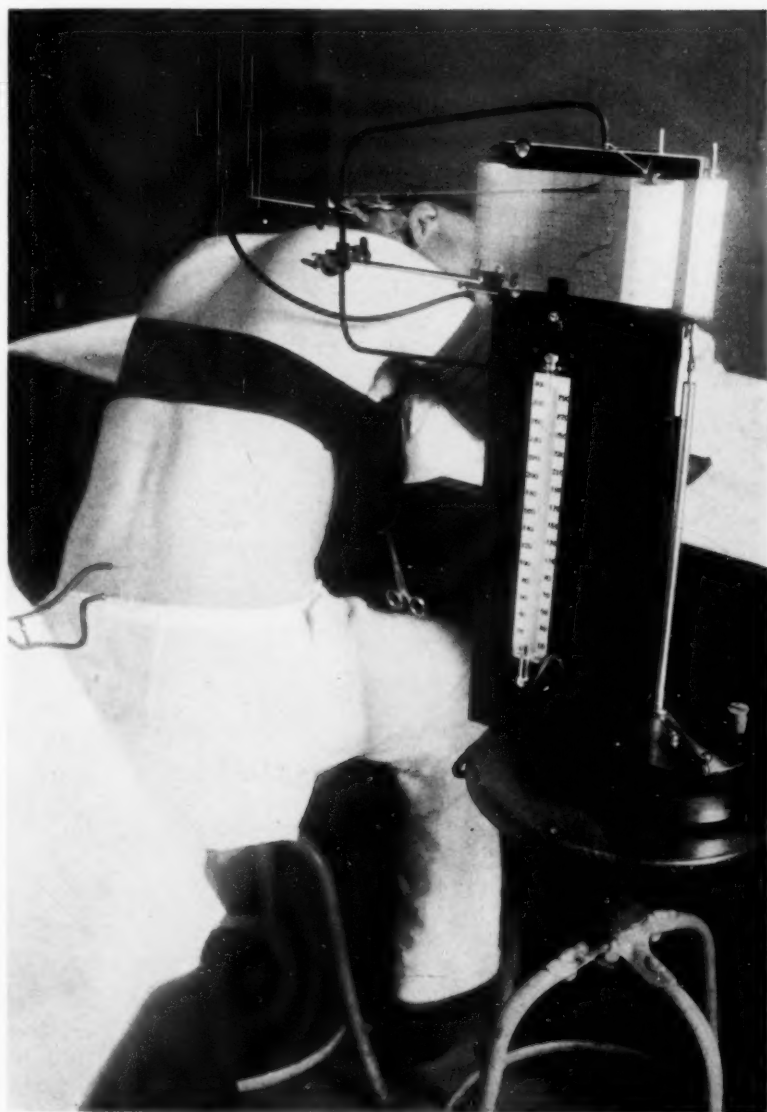
FIG. 1.—Showing apparatus for obtaining tracings during air injections.
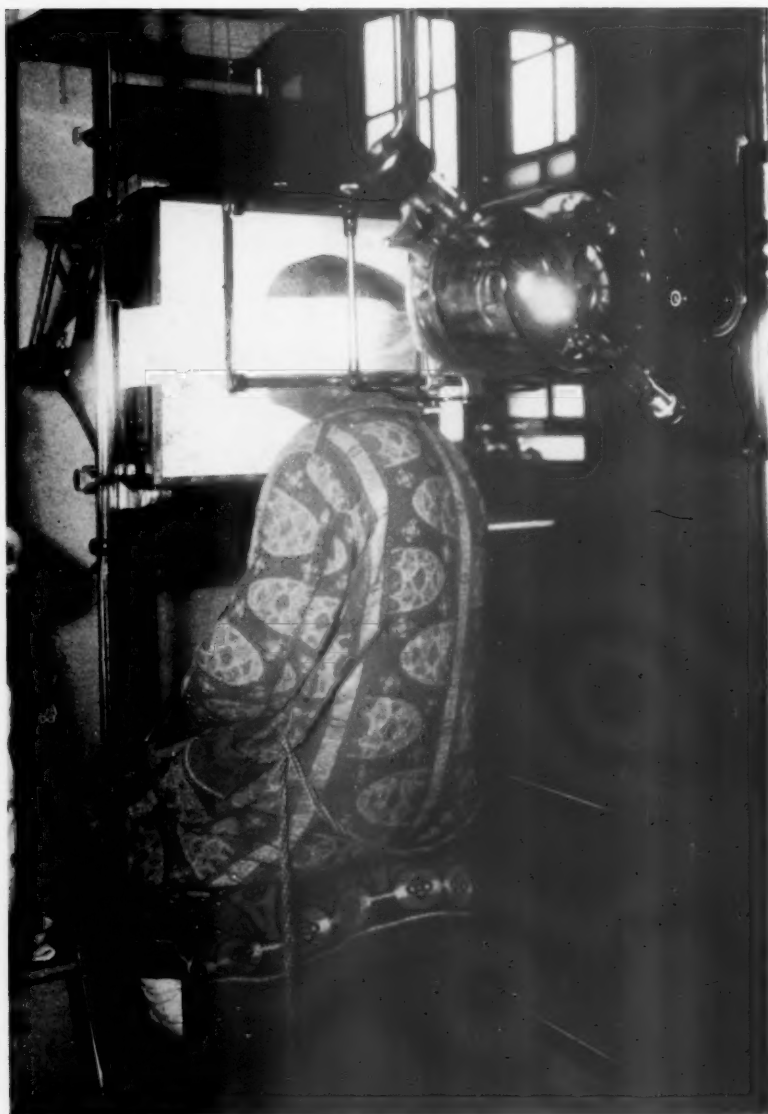
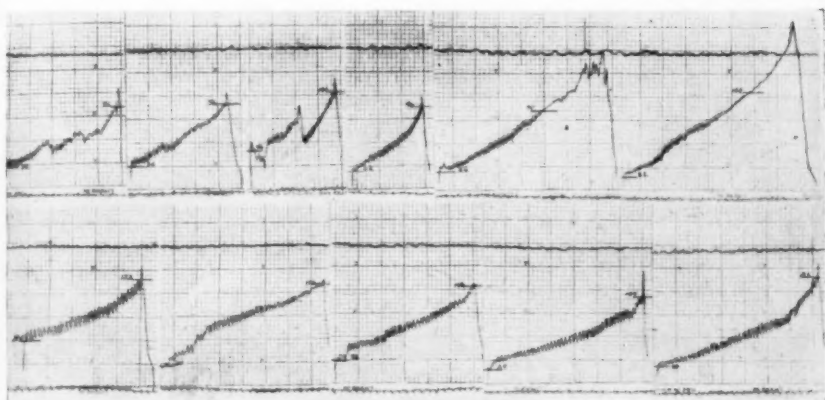FIG. 2.—Showing roentgenological technique and apparatus used.
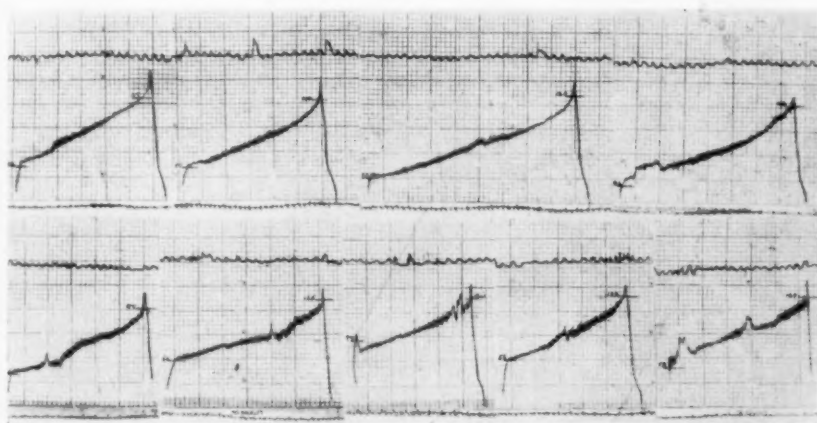
CHART I.—Moderate reaction.
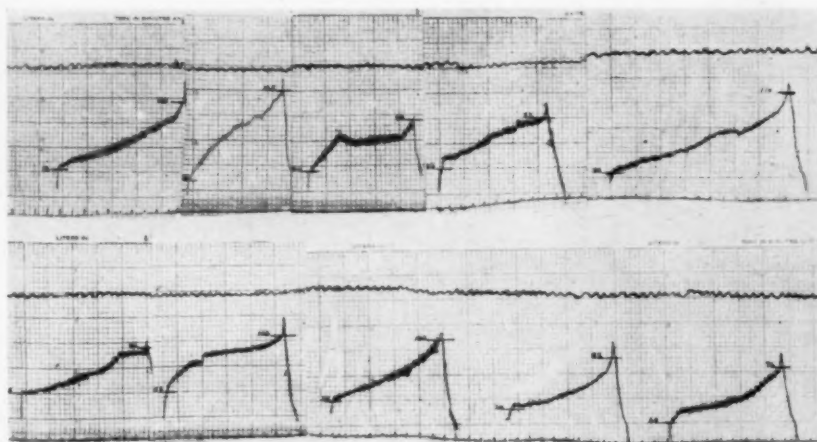

CHART II.—No reaction.

CHART III.—Severe reaction.

FIG. 3.—Showing marked arachnoiditis with dilated ventricles, compensating pathways. Characteristic of type A paretic before malaria. Psychopathic Hospital No. 3316. 210 cc. air injected.
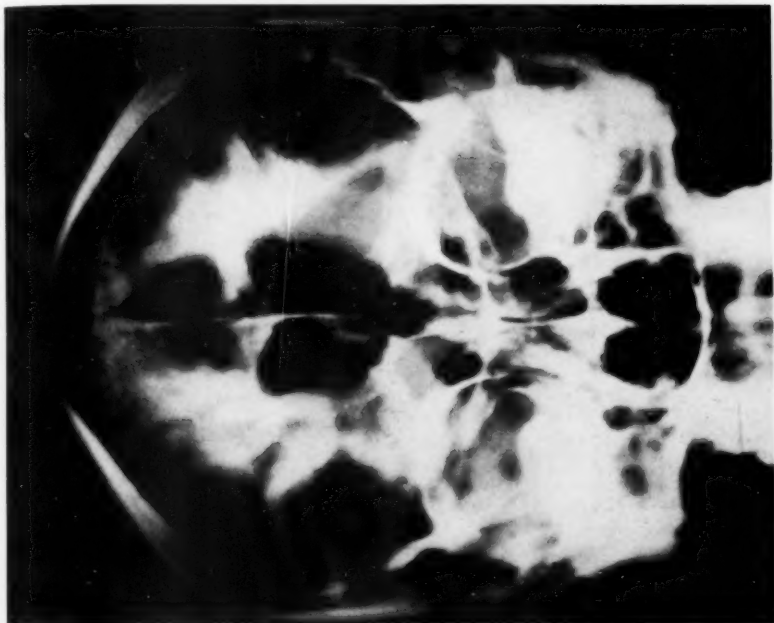
FIG. 5.—Anterior-posterior view of Fig. 4. Shows marked cortical and insular atrophy; inter-hemispheric air; atrophy in region of sulci cinguli; arachnoiditis areas.
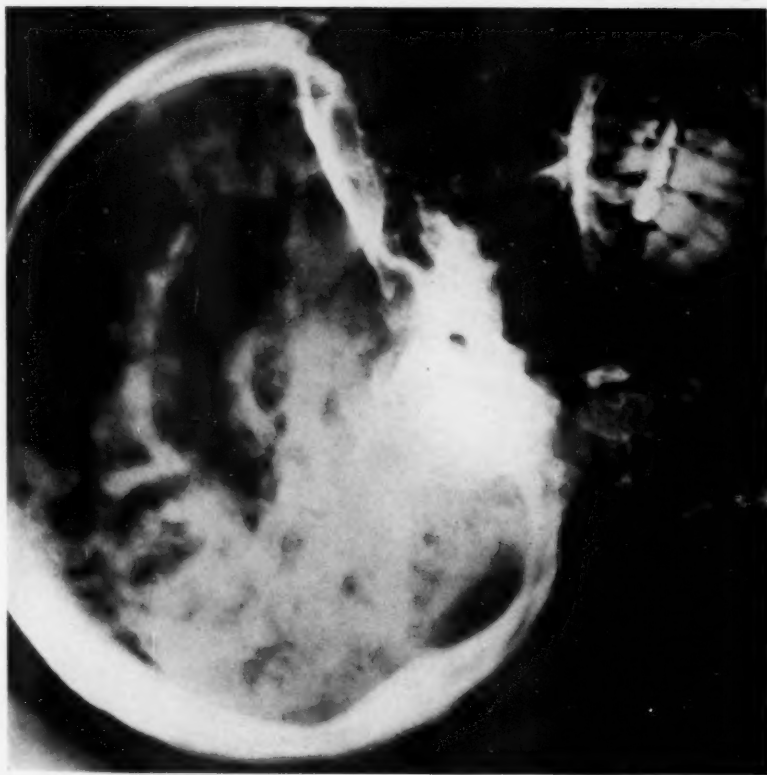
FIG. 4.—Showing extensive frontal and parietal atrophy. Obliteration of cortical architecture. (Group A.) State Hospital No. 10. 222 cc. air injected.

FIG. 6.—**Extreme** grade of atrophy; patchy arachnoiditis; dilated cisterna vena magna; ventricles not filled. Group A paretic. State Hospital No. 2. 195 cc. air injected.
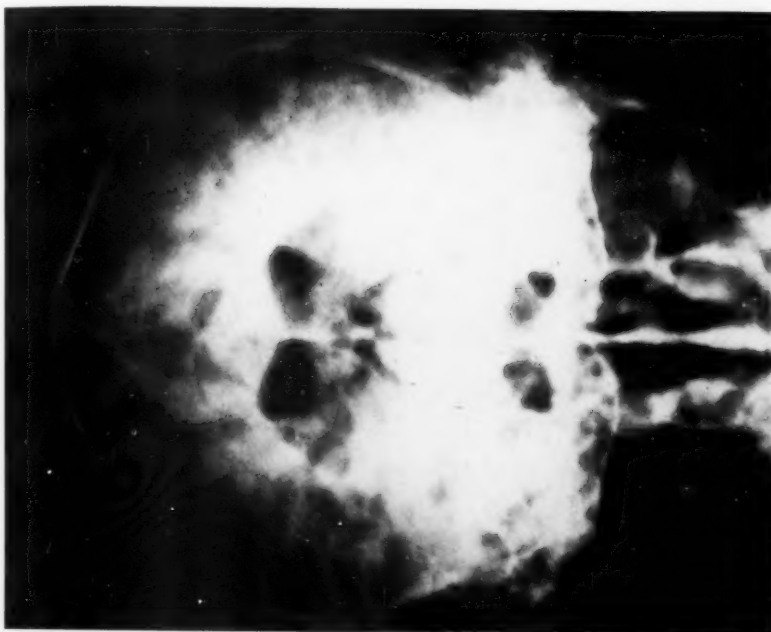
FIG. 7B.—Anterior-posterior view, type B paretic, showing extensive atrophy. Psychopathic Hospital No. 2717. 135 cc. injected.
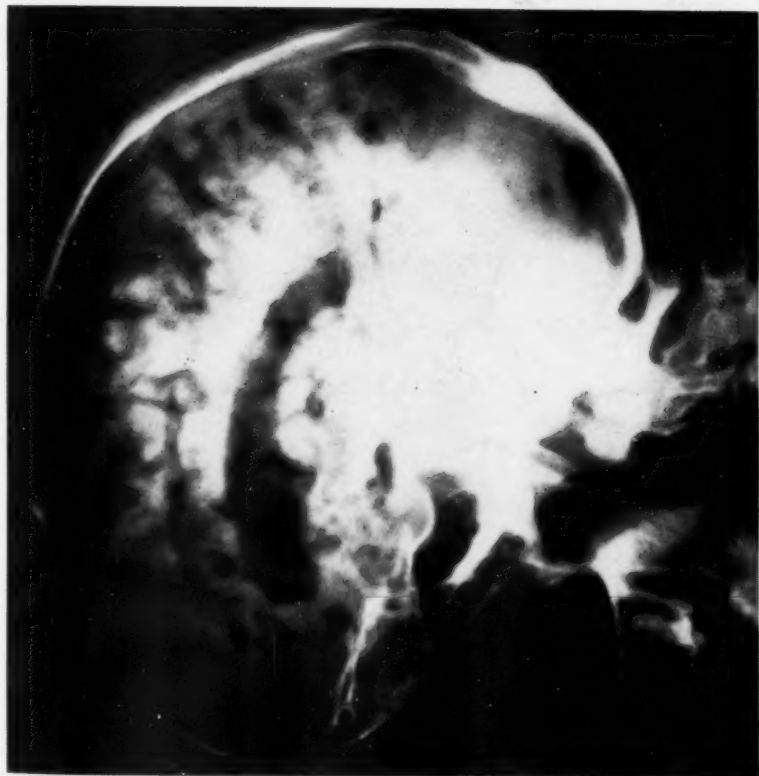
FIG. 7A.—Type B paretic showing marked degree of atrophy. Incomplete arrest. Psychopathic Hospital No. 2717. 135 cc. air injected.
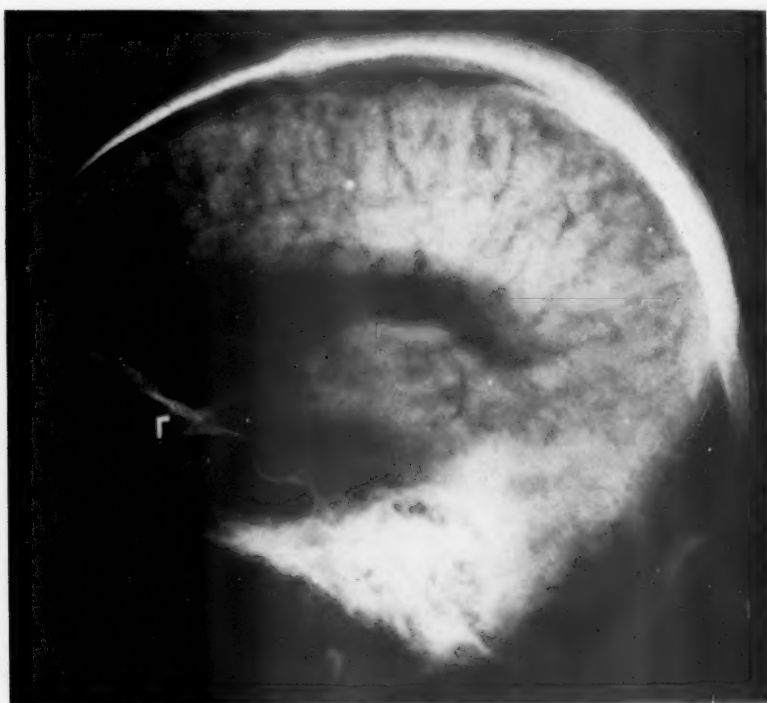
FIG. 8.—Representative of type C paretic showing fair preservation of cortical markings with slight generalized atrophy. Complete arrest after malaria. Psychopathic Hospital No. 3716. 130 cc. air injected.

FIG. 9.—Showing decrease in size of basal cisterna following malarial treatment. (Actual tracings from encephalograms.)

FIG. 108.—Seven weeks after malaria showing considerable clearing of arachnoiditis; return of some cortical markings; considerable generalized atrophy. Clinical condition complete arrest. Psychopathic Hospital No. 3281. 120 cc. air injected.
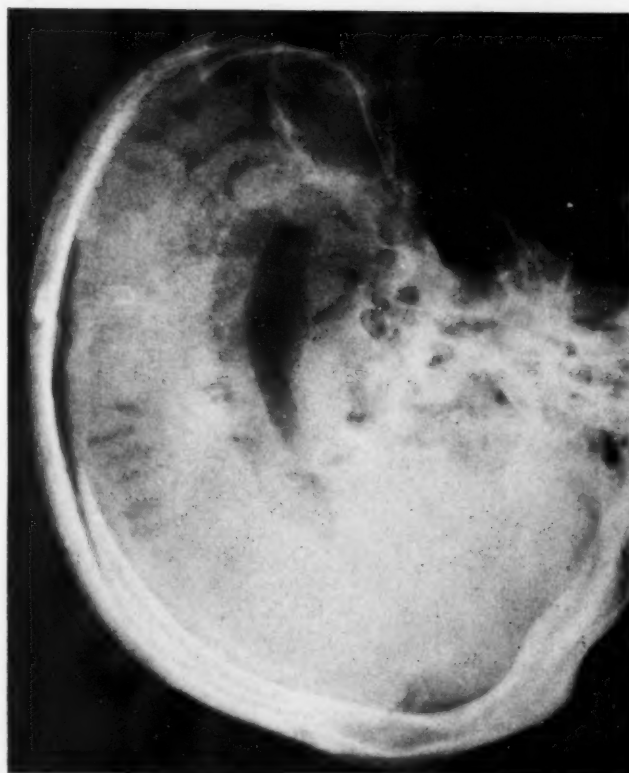
FIG. 104.—Type C paretic. Before malaria therapy showing marked arachnoiditis; slight vertex accumulation of air. Contrast photography has obliterated some of the cortical markings in this picture. Patient is now working. Psychopathic Hospital No. 3281. 130 cc. air injected.
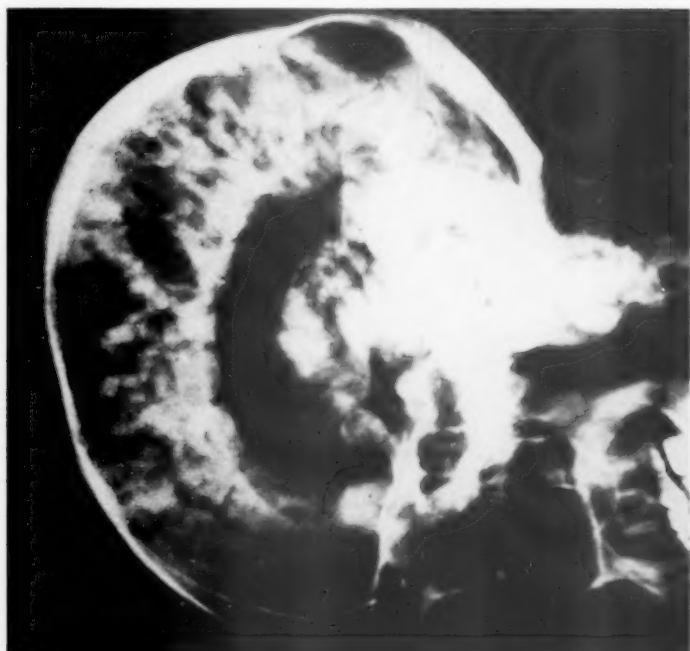
FIG. 11B.—Lateral view one month after malaria showing increase in visualization atrophy; dilated basal cisternæ. Psychopathic Hospital No. 3556. 180 cc. air injected.

FIG. 11A.—Group B paretic before malaria showing considerable atrophy with patchy arachnoiditis. Psychopathic Hospital No. 3556. 120 cc. air injected.

It has been shown [*] that the pathology of general paresis is profoundly altered by malaria, there being an initial exacerbation of the inflammatory reaction, particularly of the mesodermal elements which is shown in those cases that show improvement by resolution of the inflammatory exudate in the meninges and about the vessels and in general a gradual diminution in the intensity in the infiltrative and proliferative reactions with accompanying improvement in the cyto-architecture. In our neuropathology laboratory we have in general noted a marked decrease in the inflammatory elements in the cases showing improvement after malaria. In those cases dying of other causes following malaria we have noted also evident increase in the number of capillaries and amount of glial tissue, the brain showing evidence of an organization of the disease process. The perivascular cuffing with infiltration is much less marked, there are less ameboid glial cells, less neuronophagia and the pial edema is much improved.

The encephalograms presented have shown several stages of the " reduplication " of the fluid pathways. Some few have shown many areas in which the topography, other than a moderate degree of atrophy, resembles somewhat that of the normal brain. Most of the slides show some reduplication of pathways and, in corresponding areas, marked atrophic and structural changes. In many of them there is not sufficient resolution and opening of the fluid pathways to give a true index to how great the atrophy may be. It is evident that to get a true index to the amount of cortical atrophy all of these spaces must be opened to the air. It seems significant that most cases showing at first a marked " arachnoiditis " show extreme atrophy following malaria which previously we had no means of detecting. In our series those cases which showed practically complete " arachnoiditis " as well as markedly dilated ventricles have been the most deteriorated clinically.

The degree of atrophy compatible with function is still doubtful. In one case showing marked atrophy but excellent resolution a good result has been obtained.

We have performed encephalography on 95 organic cases other than paresis, including epileptics, traumatic cases, and multiple sclerosis. These cases do not show the alterations in brain topography which are found characteristically in paresis. There are

49

included in our series encephalograms which give visualization of many elements of brain anatomy, such as pontine and insular structure, and which indicate the potentialities of this procedure for showing normal and pathological topography.

SUMMARY AND CONCLUSIONS.

As a result of our experience with the method of encephalography in the study of 70 cases of general paresis we wish to report as follows:

1. Encephalography in careful hands is a safe clinical procedure.

2. The encephalographic finding appears to be definitely related to the pathology present in the stage of general paresis studied.

3. Clinical improvement and arrest in many of the cases studied appears to be closely correlated with the encephalographic findings present.

4. After sufficient data are collected this method may prove to be of great benefit in further clinical and prognostic groupings of this disease.

BIBLIOGRAPHY.

1. Friedman, E. D., Snow, W., and Kasanin, J. I.: Experience with encephalography via the lumbar route. Arch. Neurol. & Psychiat., 19: 762-795, May, 1928.

Pancoast, Henry K., and Fay, Temple: Encephalography: Roentgenological and clinical considerations for its use. Amer. Journ. of Roentgenol. & Rad. Therapy., 21: 421-447, May, 1929.

Report of committee on standardization of encephalography. Amer. Journ. of Roentgenol. & Rad. Therapy., 22: 474-480, Nov., 1929.

2. Liberson, F.: Apparatus for simultaneous displacement. Arch. Neurol. & Psychiat., 22: 300-304, Sept., 1924.

Liberson, F.: Value and safety of simplified method of pneumoencephalogmyelography; preliminary report on use of special apparatus in 40 cases. Amer. Journ. Roentgenol. & Rad. Therapy., 15: 231-241, March, 1926.

3. Pendergrass, E. P.: A new arrangement of the Bucky diaphragm for encephalography. Amer. Journ. Roentgenol. & Rad. Therapy., 19: 482-484, May, 1928.

4. Meyer, Adolf: Trans. of Amer. Neurol. Asso., 73, 1922.

5. Ebaugh, Franklin G., and Dickson, Roger: The use of tryparsamide in the treatment of general paresis. Results of first year's experience. Journ. of Amer. Med. Asso., 83: 803-807, Sept., 1924.

Johnson, George S.: Clinical types of neurosyphilis. Colo. Med., 1930 (to be published).

6. Solomon, H. C., and Taft, A. E.: Effects of antisyphilitic therapy as indicated by the histologic study of the cerebral cortex in cases of general paresis: a comparative study of 42 cases. Arch. Neurol. & Psychiat., 8: 341-365, October, 1922.

7. McIntosh, James, and Fildes, Paul: A comparison of the lesions of syphilis and " Parasyphilis," together with evidence in favor of the identity of these two conditions. Brain, 37: 141-194, Sept., 1914.

8. Fay, Temple, and Winkelman, N. W.: Widespread pressure atrophy of the brain, and its probable relation to the function of the pacchionian bodies, and the cerebrospinal fluid circulation. Amer. Journ. of Psychiat., 9: 667-687, Jan., 1930.

   Winkelman, N. W., and Fay, Temple: The histology and pathology of the pacchionian system with particular reference to the idiopathic and symptomatic convulsive states. Arch. Neurol. & Psychiat., 23: 44-64, Jan., 1930.

9. Malamud, W., and Wilson, R. D.: Paresis treated with malaria; relation between clinical, serologic and histologic observations, with special reference to permeability determinations. Arch. Neurol. & Psychiat., 22: 1135, Dec., 1929.

   Wilson: Histopathological changes following malarial treatment of general paralysis. Brain, 51, 440, 1928.

   Freeman: Malaria treatment of general paralysis. Histopathologic observations in fifteen cases. J. A. M. A., 88: 1064, 1927.

   Straussler and Koskinas: Further investigations on the influence of the malarial treatment of general paralysis on the histopathologic process. Zeitschr. f. d. ges. Neurol. u. Psychiat., 97: 176, 1925.

DISCUSSION.

DR. ADOLF MEYER (Baltimore, Md.).—It is indeed a great satisfaction to get a report on a condition which is so vital at the present time and one that leads us to recognize a possibility of closer approach to that which is really preoccupying us. We have in paresis probably the most striking organic disease and, fortunately, one in relation to which we do not have any longer to remain just bystanders and spectators of fate. On the other hand, there comes with our aggressive possibilities of therapy a tremendous obligation. I should like Dr. Ebaugh to give us a few words concerning his experience with regard to the effect of his therapy, because it is not only success from the medical point of view, but ultimately the possibility of guiding a treatment once started to where it can be socially safe. I suppose that everybody who deals with the malarial therapy has run into very considerable difficulties such as those who just allowed the disease to take its course never experienced. We find remissions in cases that are not able to " remit " and whose families are not capable of judging what they are dealing with. Between the patient and the family, there very often arises a desire to utilize the improvement so as to make the income of the family and of the patient continue,

when perhaps for the patient to continue at his job involves a very grave hazard for the community. Consequently, we are confronted here with a condition in which we have an initial damage and we should like to know how we can measure that damage and how we can arrive at an idea as to when we might expect a restitution commensurate with the intellectual and economic honesty of the family and of the patient in case that things might not come out quite as well as it would look at the beginning.

It is quite obvious that we might ask whether we are quite entitled to speak of "pathology" with an intimation of our having the real and final facts. We know that the brain is not quite as static an entity as we believed when we studied it very largely after it came out of the formalin jar. We know that the brain is a structure which can, without any functional damage, be shrunk and which can be enlarged in the process of the fluid distribution. Therefore, we have to remember, when we speak of atrophy, that we deal with a relation of something that we cannot absolutely measure with light or with the air that may come into the passages. I should think, nevertheless, that we have reason to be grateful to Dr. Ebaugh for showing us the possibility of getting an additional measure, a very valuable measure in addition to that which is always necessary, namely, the study of the case and the situation and the functional study of the job.

After all, the efficiency of the brain and its shape are rather difficult points to correlate. We see that particularly in senile dementia, where we very often find in a person that was formerly exceedingly intelligent a retention of a great deal of formal correctness in his talk and writing. We see then the apparent discrepancy between a very much shrunken brain in an individual that has kept a very good talking capacity. Therefore, we have to recognize that we have here two sets of facts rather difficult to measure by themselves and to compare. I was anxious to urge particularly the necessity of considering all the facts, including the integrity of the patient and of the family concerning the responsibility of being satisfied with the results the treatment will attain in the actual case without the assumption that "recovery" will necessarily mean a capacity to return to the former job.

I think we are all very grateful to Dr. Ebaugh for giving us this additional set of facts so clearly brought before us.

DR. SAMUEL T. ORTON (New York City).—I have recently had my attention drawn rather acutely to this problem of encephalography in following a series of autopsy cases in which encephalography had been used as a means of focalization in brain tumors, and I found some things which have rather challenged my interest and attention.

One thing that the radiographers tell us readily is that the markings which you will see so frequently which simulate a gyral pattern on the brain are evidence of increased intracranial pressure and that the bone has atrophied because of the pressure against it by the brain mass. But interestingly enough, not infrequently with cases with very striking increase of

internal pressure, you will find on autopsy that the gyral pattern, so called. of atrophy of the bone doesn't correspond at all with the gyral pattern of the brain. You can't fit the two together in the least.

I have recently had one very striking case of that nature in which there was a long-standing case of hydrocephalus, blockage of the aqueduct of Sylvius, gliosis, and a great distention of the brain in which the convolutional pattern, so called, or gyral pattern, so called, on the inside of the surface of the skull didn't fit in the least with the pattern of the brain; in many places the ridges of the skull actually crossed the convolutions, actually were out of harmony with the picture.

Another point of rather fundamental interest that comes forward here is how aptly can we make the comparison from case to case? When we realize that these dark shadows which we are seeing on the screen here in the majority of instances, are cast by a layer of air that is only a few millimeters in thickness and that that shadow is cast in spite of the fact that the x-ray has had to penetrate several layers of bone and many inches of brain, and in many instances fluid retained there also, you see how very doubtful is the accurate interpretation of a lesion here or a lesion there, unless it be a very serious and gross one. That brings us, of course, to the intimate question which Dr. Ebaugh has raised for us, that of the interpretation of atrophy and arachnoiditis, two distinctive pathological conditions interpreted here on the basis of shadows thrown on the screen. Personally, I feel that is unjustified. I think practically all that you can say is that there are air spaces here and you must leave your diagnosis at that place until there has been an accurate check as to the atrophy in those cases by autopsies—cases in which the encephalogram has been done.

I think we are apt to find the situation comparable to that which I have outlined in cases of internal hydrocephalus; that the atrophy pattern we find in the actual brain at autopsy does not conform to the shadow picture which you have found in the x-ray picture at all. Moreover, as Dr. Meyer has already pointed out to you, atrophy is a doubtful diagnosis in these situations, particularly as we know the volume of the brain mass can be very strikingly altered without true atrophy taking place. In other words, there are hydrostatic factors there, cerebrospinal fluid, blood volume, and factors of that nature, which must be taken into cognizance as well as the question of true atrophy.

I think we are very prone to assume that in a process like paresis where you see a shadow of this nature, you have lost brain substance, but it is exceedingly difficult to prove you have lost brain substance of any consequence to the individual.

I have recently seen a pressure atrophy of the cerebellum by hydrocephalic pressure in which the width of each cerebellar lamina was reduced to approximately two-thirds of that of the adjacent areas. I have been over that particular area in contrast to its adjacent portions with extreme care with many methods and I can't for the life of me tell what elements have been lost in the shrinkage atrophy. It is a general reduction of the mass in which

you cannot lay your finger on any organic damage to any single element of that particuar structure. I think that maybe the situation which we are faced with in these cases in which we casually say, " Here is a brain with many shadows," is one where we may ask: " Is there probably serious atrophy and therefore permanent damage? " I think the history of many of our paretics shows us that the damage is not serious in the sense that the essential structures have not been destroyed. That is even better brought out in cases of massive hydrocephalus where the major functions of the brain seem to be continued even though the mass of white matter of the central core of brain be reduced to possibly 25 per cent of its normal content. In those it is quite easy to show that the major loss of that type is loss of thickness of myelin sheaths. There are no nerve fibers gone, there are no nerve cells gone, but the atrophy is a loss of material which is not absolutely essential to the normal functioning of the brain. So I feel there is reasonable doubt as to the interpretations of either arachnoiditis or atrophy from the radiograms without adequate autopsy and histological check to show us that these pictures that we have seen are actually pathological conditions.

DR. WALTER FREEMAN (Washington, D. C.).—I have examined pathologically many scores of brains from cases of paresis, but I sometimes, nay often, have difficulty in demonstrating satisfactorily to students the changes present. You might say that the students are not sufficiently familiar with the aspect of the normal brain to recognize a paretic, but after the brain is removed from the skull, the relationships between the brain and the skull disappear and the brain must be judged, as it were, upon its own merits. In Dr. Ebaugh's x-ray photographs, we have those relations preserved, and I think anybody looking at those would realize the massive devastating effect of syphilis upon the brain.

The question of atrophy *versus* arachnoiditis, of course, is an important one. I think that where we have the obliteration of the normal pathways, we should be very guarded in our interpretation of the underlying pathologic process, particularly as far as atrophy is concerned, because the failure of these fluid spaces to fill with air certainly masks the atrophy, if such there be. However, one of the most promising features that Dr. Ebaugh has shown I think is the reopening of such pathways following malaria. We know that once malaria has been given, there is a regression in the inflammatory findings, so that we must suspect that the fluid openings would again be present, but this is the first demonstration that I have seen of such an effect. I would like to ask Dr. Ebaugh whether the patient was submitted to x-ray before the injection of air in these follow-up cases to determine whether there were lakes of air still remaining in the meshes of the arachnoid tissue; also, what his explanation would be of the decrease in size that seemed to be present in some of the ventricular systems which he has shown.

DR. M. SANDELHAUSEN (Hungary).—We have no norms for the evaluation of the normality or abnormality of shape, position and size of the

lateral ventricle nor for the third ventricle. In sections and particularly of encephalographic pictures this lack causes uncertainties and errors.

The speaker has obtained longitudinal sections of 25 brains with a method, which permits us to measure all desired points on one single plane. The frontal and horizontal sections of 25 additional control brains were done with the usual methods.

In keeping with the postnestes and suggestions rising from the clinical experience of Prof. Ransehburg the investigations dealt with: First, the determination of the total configuration types; second, with that of the size values (a) the absolute length of the brain ventricles; (b) of the relative length of the latter, as compared with the length of the hemispheres; (c) with the determination of the distances of the foremost, hindmost, uppermost and lowermost parts of the lateral ventricle from the corresponding points of the hemisphere surface; (d) the greatest height of the lateral centi; (e) the distance of the anterior and posterior ventricle poles, from the lowest point of the inferior horn, etc.

Though we deal exclusively with the brains of healthy and adult people, all values show great and sometimes exceedingly great scattering around the mean. This scattering amounts to 11 per cent for the brain length; 11½ per cent for the length of the ventricle; about 15 per cent for the relative length of the ventricle; 14.6 per cent for the distance of the anterior ventricle pole from the anterior hemisphere pole; and as much as 20 per cent for the distance of the posterior ventricle pole from the occipital hemisphere pole.

All this speaks for the necessity of a consideration of greater caution in the determination of the pathologic nature of the form and size of the brain ventricles and their single parts. Further investigations are under way.

Dr. FRANKLIN G. EBAUGH.—I wish to thank those who took part in the discussion. It shows very vividly how many unsolved problems we have in connection with this method. I feel very definitely as Dr. Meyer mentioned, we should study the set of facts for what they may be worth, for what they may represent. This set of facts, of course, is but a small part of the total picture of general paresis.

The problems that Dr. Orton has brought up are very timely ones. We have had a similar experience with our x-ray men. We have only been able to make a comparison of neuropathological material in two cases.

I am very glad to know of the correlation that Dr. Orton has made. Surely that will be a great help in the continuation of the studies.

Dr. Meyer brings up the question of the fate of paretics. We have only followed our cases now for a five-year period, slightly less than that. Our follow-up studies have included 85 per cent of all the paretics that have been treated by malaria. We hesitate in basing the criteria for a complete arrest or an incomplete arrest which we prefer to the term remission, on social and economic factors alone. We have had many variations in the report from relatives. We have actually had some difficulty in our outpatient follow-up, social service follow-up and so forth, centering around the over-statements

given so frequently by relatives. Our complete arrests are less than those reported from other clinics. I think for this reason we are running practically 10 per cent less than the reports from other American clinics. We feel quite pleased in that the evidence now at our disposal indicates that of approximately 40 per cent of this group, many have been followed nearly for five years and are adjusting and getting along in the community—some with decreased social efficiency and some with increased social efficiency.

Dr. Freeman's question regarding the decrease in size of the ventricles, we explain in many cases on the basis of imperfect technic, an imperfect drainage of all of the fluid. In other cases we feel that it indicates a regression in the inflammatory reaction following malaria therapy. The mechanical factors here are very great regarding the actual encephalographic technic used.

SOME EFFECTS OF THE INHALATION OF CARBON DIOXIDE AND OXYGEN, AND OF INTRAVENOUS SODIUM AMYTAL ON CERTAIN NEUROPSYCHIATRIC CONDITIONS.*

By H. C. SOLOMON, M. D., M. R. KAUFMAN, M. D.,
F. D'ELSEAUX, M. D., Boston, Mass.

By means of moving pictures, we are demonstrating some effects on neuropsychiatric patients produced by the inhalation of high concentrations of carbon dioxide and by sodium amytal given intravenously. Before showing the moving pictures, we would like to give a brief résumé of the work of Lorenz and Levenhart. They published the results of their work in certain patients, especially those with stupors, showing that the inhalation of a mixture of 40 per cent carbon dioxide and 60 per cent oxygen had the effect of rousing patients from a catatonic-like stupor, so that they regained a normal, or quasi-normal, contact with the environment. They later showed that a similar result might be obtained following an anesthesia provoked by the intravenous injection of sodium amytal.

The idea of this work emanated from the experience and theoretical considerations of Dr. Lorenz, who evidently felt that part of the psychotic manifestation was due to inefficient respiratory activity. His experience with the use of cyanid salts, for the stimulation of respiration, led him to believe that there was some merit in his idea, and thus, with the assistance of Dr. Levenhart, the utilization of carbon dioxide, which is an active respiratory stimulant, was undertaken. At this time we shall not consider the ideas expressed by Drs. Lorenz and Levenhart as the reason for the effects obtained, but rather will allow Dr. Lorenz at his own time to describe his ideas, which, as we understand it, are somewhat

different from those published in his original paper. It will be sufficient to state that we have repeated the experiments both with the mixture of carbon dioxide and oxygen, and sodium amytal, and have obtained results similar to those reported by the above-mentioned authors.

Without further introduction we present the moving pictures, which are largely self-explanatory.

The first pictures shown are those of a woman suffering from a psychosis, the presenting symptoms being mutism, very slow bodily movements, no tendency to look after her bodily wants, the facial expression is that of confusion, gait is similar to that of a patient with Parkinsonism minus the tremor. The diagnosis rests between that of benign stupor and a catatonic-schizophrenic condition.

On repeated experiments it was found that after breathing a mixture of 40 per cent carbon dioxide and 60 per cent oxygen * for a matter of two to three minutes, and then being allowed to breathe room air or oxygen mixed with room air, the patient became quite normal in her responses and activity. Her face took on a normal expression with a tendency to smile, she at once stated, " I feel better now." Upon request, she sat up, got off the bed, walked about the room, no longer manifesting the Parkinsonian-like attitude. All her movements became normally lively. She talked freely, coherently, and intelligently, stating that previously she felt confused, did not know how to express herself, and felt that it was too great an effort.

While breathing the gaseous mixture, there occurred very promptly a marked increase in the depth of respiratory movements, although not a great increase in their rapidity. The face became quite surfused and red. In the course of a minute and a half there was loss of consciousness, the pupils dilated widely, and in some instances movements of the periocular muscles of convulsive or tetanic-like form occurred. At times a more general convulsive picture was observed, with movements of the hands

* There is reason to believe that the patient was not breathing this exact mixture, as there was considerable leakage about the mask in this experiment, and in most of the others, which allowed room air to be mixed and therefore diluted the mixture that comes from the mixing chamber.

and feet somewhat suggestive of a Parkinsonian tremor, though of a marked character. When the gas mask was removed, the respiration continued deep for approximately a minute, and then consciousness was quickly regained. The period of lucidity and more or less spontaneous activity lasted, on the average, 15 to 25 minutes. At the end of about 15 minutes, a somewhat startled, amazed, confused expression came over the face. The patient began to move more slowly, responses to questions were delayed, she showed difficulty in calling names which she knew well a few moments before, and at the end of another 5 to 15 minutes the original state was regained. Repeated experiments always produced the same results.

It may be interesting to note that in the course of a few months this patient began to show a definite improvement. Slowly she began to take an interest in things and to talk a little. At this period she was always ready and anxious to undergo the experience of taking the gas as she said it made her feel better.

The second patient shown in these films bears the diagnosis of catatonic dementia præcox. He has been mute, uncooperative, slow in his movements, sloppy in his dress and habits. Experiments were performed during his second hospital stay. At a previous hospital residence he had a condition similar to what he presented at the time the pictures were made. He made a fairly good remission for some months and then relapsed. The pictures show that after the inhalation of the gas mixture, he was much brighter, talked, dressed himself quickly, made himself rather neat, asked to be allowed to go to the cafeteria to eat, and when told he could do so if he cleaned up, he immediately started lacing his shoes and rushed out of the room rapidly in order to go to the cafeteria.

The third patient whose pictures are shown is a hospital resident of many years, showing the chronic terminal stage of a catatonic dementia præcox. He does not talk, has marked cerea flexibilitas. The inhalation of gas produced violent convulsive movements following which he sat up and talked a gibberish or word-salad replete with obscenity.

The next two patients shown on the film were suffering from very marked Parkinsonism of epidemic encephalitis. Neither patient was able to get off the bed nor to walk. The first of the

two patients was even unable to turn his head. The tremor in both was very marked. With the inhalation of the gas mixture, both patients showed a marked increase of their paralysis agitans tremor, in one case leading to convulsive movements. Following the breathing of room air, a marked decrease in the tremor and rigidity was noted. The man, who previously was unable to move, could be raised and was capable of spontaneously moving his head and looking from side to side. The second patient was able to get up off the bed and to walk about the room, doing this on her toes. In other words, in both cases, following the inhalation of the gas mixture, there was a reduction of both tremor and tonicity.

The final pictures on the film show the effect of the intravenous injection of sodium amytal. This patient showed a negativistic, resistive, mutistic syndrome. In order to inject the sodium amytal it was necessary to restrain him. About a minute and a half after the injection, the patient yawned, was willing to be placed on the bed, and at the end of three minutes was in a deep sleep which he maintained for nearly two hours. He awoke without the period of drowsiness and confusion characteristic of ether anesthesia. At the end of a few minutes he was apparently quite awake and talked fairly freely. He showed normal facial expression and was reasonably cooperative. This condition lasted for approximately a half-hour, when he again lapsed into his former state of catatonic-like attitude.

Our experiments have been carried on almost entirely with patients falling in the group of stupors or catatonic-like conditions. The effect of the inhalation of the mixture of carbon dioxide and oxygen and the effect of the injection of sodium amytal are very similar as far as the change in the mental attitude of the patient is concerned. It has been our experience that patients with long-standing schizophrenic symptomatology show less response to the carbon dioxide and oxygen mixture than do the patients in more acute attacks or those who seem to fall more likely into the group of benign or toxic infectious stupors. It has also been our impression that patients with definitely psychological retractions from the environment do not react at all satisfactorily to this method. We do not wish to make this statement with any degree of finality, but that is our first impression.

Our second definite impression is that when patients with long-standing schizophrenic symptoms are treated in this fashion, the most that happens is an odd, word-salad-like response, leading us to question if this is not the full capacity of their cerebral process at the time.

We believe that the work of Lorenz and Levenhart, of Waters, and of ourselves, is completely convincing that either by the use of carbon dioxide and oxygen mixture, or the use of sodium amytal, it is possible to change the mental activity and the conduct of certain patients very promptly. Accepting then that we are able to effect these changes, we form the hypothesis that it is done upon a physiological level, that there has been a change in the physiology of the brain induced by these methods. We further assume, therefore, that the conduct of the patient is due to some interference with the normal physiology of the brain. In this assumption we do not consider whether the disorder is primarily psychogenic or not. We may well assume that originally a psychic problem led to a disorder in the physiology. An analogy may make this point of view clearer. We accept that occasionally the symptoms of hyperthyroidism follow upon emotional experiences, but after the thyroid gland has reached the stage of hyperfunctioning, the further results are definitely due to a disturbance of the general metabolism and glandular activity.

Our point of approach to the problem is to try to determine what occurs as a result of the artificial condition that returns the patient to a more normal condition of psychological function; in other words, what changes take place in the physiology of the organism.

Observations of patients receiving the carbon dioxide mixture show that there is an increase in the depth of respiration with an increase in the alveolar tension and a consequent increase in the amount of oxygen and carbon dioxide received into the blood stream. There is an initial increase of heart rate, the systolic blood pressure is raised, there is a dilatation of the superficial vessels of the face, and we have found that there is a very great increase in the cerebrospinal fluid pressure as measured by a manometer attached to the lumbar puncture needle. In one instance the cerebrospinal fluid pressure rose to 600 mm., which is com-

parable to the highest pressures that one finds in increased intra-
cranial pressure from brain tumors, and approximately that which
can be produced by pressure on the jugular veins.

The experiments of Cobb and Forbes have shown, by the use
of a glass window put into the skull of an animal, that when rela-
tively small percentages of carbon dioxide are breathed, there is
a marked dilation of the cerebral vessels. One of us (Kaufman),
in association with Professor E. A. Spiegel, has shown that similar
effects are produced by the use of the higher concentrations of
carbon dioxide.

We may therefore conclude that by the use of this method there
is a stimulation of the medullary center of respiration, an increase
of the carbon dioxide and oxygen content of blood, and increased
flow of blood and dilation of the cerebral vessels, and an increase
of intracranial pressure.

As is known, histamine produces a similar effect insofar as that
there is a slight increase in the blood pressure, an increase in the
cerebrospinal fluid pressure, and dilation of the vascular bed. A
patient who reacted to the carbon dioxide and oxygen mixture was
given as large a dose of histamine as was deemed safe. An increase
in blood pressure resulted, dilation of the vessels of the face, and
the cerebrospinal fluid pressure was raised from about 150 to
250 mm., in contrast to the 600 mm. produced by the carbon
dioxide-oxygen, but without producing any change in the actions
or conduct of the patient.

Studies are now being undertaken to determine the changes
which take place in the body with the inhalation of carbon dioxide
and oxygen. One of us (D'Elseaux) breathed a mixture contain-
ing approximately 20 per cent of carbon dioxide and 40 per cent
oxygen and 40 per cent nitrogen. At the end of two minutes
unconsciousness ensued. Arterial puncture was done, two minutes
after the beginning of inhalation of the mixture, and one minute
was consumed in withdrawal of the blood. Analysis of this blood
showed that the carbon dioxide content was 69.27 volumes per
cent, which compares with the average normal content of 40 to
45 volumes per cent. In other words, it shows marked increase
in the carbon dioxide content. The blood showed an oxygen satu-
ration of 97.10 per cent, which compares with the theoretical nor-
mal oxygen saturation of about 95 per cent, breathing room

air. The P_h of the arterial blood was 7.08. The average normal P_h of the blood is 7.3 to 7.5, whereas a P_h of 7.00 or less is not consistent with life. It is therefore found that this mixture produces a marked drop in the P_h of the blood. In other words, there is rapidly produced a condition of acidosis associated with increase in the oxygen and carbon dioxide content of the blood. One effect of the acute acidosis is unquestionably the unconsciousness which is comparable to the unconsciousness occurring in diabetic acidosis.

At the present time we are not in a position to discuss the mechanism by which unconsciousness is produced in the case of sodium amytal. We do assume that the unconsciousness in the case of the gas inhalation is due to the acidosis. Of some interest, however, in this regard is the following observation made by Drs. Kaufman and Spiegel to the effect that if an animal is anesthetized by a barbaturic salt and then given this mixture of gas, that death ensues, suggesting that there is an increase in the action which may well be similar in type. This is in contrast to the effect of carbon dioxide in cases of sleep produced by a volatile drug like paraldehyd, in which instance consciousness is restored by the effect of inhalation of carbon dioxide and oxygen.

In order to have a working hypothesis to explain the apparent restoration of function by the two methods described, we propose the following, hoping that it will be thoroughly understood that this is purely a working hypothesis and that we expect no more of it than that it will give us a basis to work upon. We assume that in the case of the stuporous patients (and similarly some of the encephalitic Parkinsonian syndrome) that there is a reduced activity of the cerebral neurones. We further assume that this possibly is dependent upon an interference with the normal metabolic activity of the cell, either in the anabolic or catabolic phase. Now when carbon dioxide is inhaled there is possibly a further lessening of this metabolic activity resulting in the lessened activity of the neurones and in the clinical manifestation of a loss of consciousness. With the cessation of the administration of carbon dioxide the processes referred to are relieved from interference, with the result that they seek the point of equilibrium maintained previous to carbon dioxide inhalation. In so doing they are necessarily speeded up and may overstep the previous point of equilibrium;

that is, approximate a more normal degree of metabolic activity
with a consequent more normal degree of nervous activity shown
by more normal contact with their environment.

This hypothesis would similarly explain the situation in regard
to sodium amytal anesthesia. As the effects of carbon dioxide and
sodium amytal are only temporary, the results cannot be long-
lasting and thus in the course of a few minutes the original condi-
tion of lessened activity would again exist; that is, the original
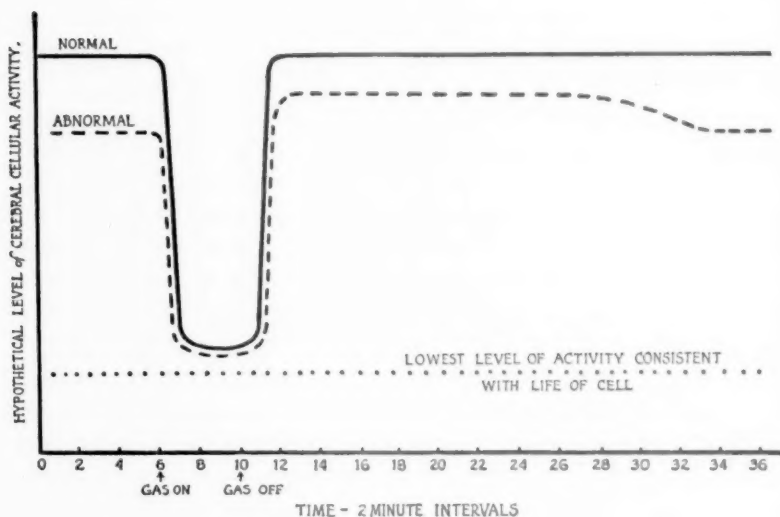
point of metabolic equilibrium of the cells would again ensue. The
accompanying diagram illustrates this conception.

From the experiences with the carbon dioxide and oxygen mix-
ture, one cannot avoid a consideration of a possible direct stimula-
tion of the cellular structure by carbon dioxide, because carbon
dioxide is reputed to act as a specific stimulant to the cells of the
respiratory center and therefore may likewise act as a specific
stimulant to cerebral cells. However, this is a very complicated
subject which we are not prepared to discuss, and the experiences
with sodium amytal and our present knowledge concerning the
action of this drug, do not support the hypothesis of direct
stimulation.

Assuming that the conduct of the stuporous patient is the result of inefficient activity of brain cells, we are intrigued to discover whether it is the cells of the cerebral cortex or those in the subcortical regions that are abnormally functioning. The general posture of any of the patients so closely duplicating that seen in disorders of the extra-pyramidal system, the tendency of carbon dioxide mixture to produce movements similar to those seen in such syndromes followed by a return to more normal posture, leads one to consider the possibility of the disorder being subcortical.

Light is thrown on this subject by the experiments of Kaufman and Spiegel. They produced cataleptic-like effects in animals by the use of bulbocapnine. The bulbocapnine is supposed to affect the cortical areas. After producing the cataleptic-like state, carbon dioxide was administered in exactly the manner given to the stuporous patients, and the results obtained were entirely analogous, in that the animals came out of the cataleptic state, becoming lively and responsive. It is also of interest that this improved state continued only a short time and was followed by a fading into the cataleptic state once more, similar to what is seen in the patients. From this evidence one concludes that the cortex is implicated, although it does not prove that it is solely involved to the exclusion of other portions of the brain.

SOME EXPERIMENTS ON THE EFFECTS OF CAF-
FEINE, ADRENALIN AND BROMIDES UPON
THE SUSCEPTIBILITY TO EXPERIMENTALLY
INDUCED CONVULSIONS IN ANIMALS.*

By J. NOTKIN, M. D., AND F. H. PIKE, PH. D.
(*From the Laboratory of Neuro-Surgery and the Department of Neurology
Columbia University.*)

In a previous study [1] we emphasized the combined action of
various convulsant agents in lower mammals and amphibians with
particular attention to lactic acid, one of the constituents of the
body fluids found in increased proportion in patients with convul-
sive states both during the attacks and in the intervals. [2] We wish
to present some further facts on the action of other substances
which have close relationship to some which occur naturally in
animal organisms as products of metabolism and internal secretion.
Our experiments so far have been limited to caffeine, a trimethyl-
xanthin which is closely related chemically to the purine bases
(xanthin, adenine, guanidine) and to commercial adrenalin, which
is related to the incret (epinephrine, Abel) of the suprarenal
glands of vertebrates. We will also give some results of the effect
of bromide upon the susceptibility to absinth in animals.

The administration of large quantities of caffeine may produce,
along with the well known symptoms of headache, confusion and
delirium, tremors and convulsive movements of the hands. In
lower mammals the injection of large quantities of caffeine is
followed by symptoms resembling those induced by strychnine,
namely: increased reflex irritability. This has been reported by
Rosett [3] in his experiments on reptiles. He injected 0.015 and
0.03 gm. respectively of caffeine citrate per pound body weight
in two snakes. He states that the slightest touch or tap on the
table produced severe contractions shortly after the injection.
Cushny [4] states that after the lapse of time contractions were
observed even without apparent stimulation, terminating in a tonic

convulsion of a few seconds duration. Cushny thinks that the symptoms produced by caffeine in lower mammals are due to its activity on the spinal cord in the same way as those due to strychnine; he adds, however, that small doses may act on the brain also and particularly on the medulla oblongata as it is evidenced by the accelerated breathing and occasional slowness of the pulse rate (action on the center of vagus). Rosett reports that administration of caffeine citrate in doses of 0.02 gm. four times daily increases the frequency of convulsions in individuals subject to convulsive states. This, however, seems to be in contradiction to the observations of Karger,[5] Pethe[6] and Peritz[7] who have obtained beneficial results in certain cases of epilepsy treated with caffeine. Peritz, however, used 6 to 9 gm. of caffeine daily.

We have injected caffeine intravenously in a number of cats. We also used caffeine in combination with absinth. The results of our experiments were tabulated (Table I). No real convul-

TABLE I.

EFFECTS OF INTRAVENOUS INJECTIONS OF CAFFEINE IN CATS.

Dose per pound of body weight in grains.	Effects.
0.15	Tonic extension, pads of feet moist, pupils slightly dilated.
0.25	Slight twitches of forepaws, spasmodic cry.
0.3	Violent excitement, pads of feet wet, urinary emission.
0.55	Immediate excitement, pupils dilated and contracted, pads wet.

sions were produced with relatively large doses of 0.55 grain of caffeine per pound of body weight. However, the reaction does not seem to be a constant one as in some instances a smaller dose of 0.15 grain per pound of body weight produced a tonic extension of the paws and a slightly larger dose of 0.25 grain slight twitchings in the fore paws. In all instances, however, there were signs of increased activity of the autonomic system, as was seen from the increased perspiration, pupilary changes and urinary emission.

When caffeine is combined with a small dose of absinth, a dose which is even lower than the subliminal convulsive dose, the action

is quite different (Table II). Severe convulsions were produced with a dose of 0.023 gm. of absinth per pound body weight when injected together with a dose of 0.14 grain of caffeine per pound body weight. The same effect was noted when caffeine was injected two to ten minutes after the injection of a very small dose of absinth. In all instances the convulsions were of longer duration than with absinth alone and generally fatal. The same effect

TABLE II.

COMBINED EFFECTS OF INTRAVENOUS INJECTIONS OF ABSINTH AND CAFFEINE.

Dose of absinth per pound of body weight in cc. of standard solution.	Dose of caffeine per pound of body weight in grains.	Effects.
0.02	0.14	Excitement.
0.023	0.14	Increased respiration, clonic twitches, cry, convulsion with tonic extension in fore and hind limbs, dilatation of pupils, gasping respiration, unequal pupils.
0.03		Excitement, twitches.
	0.18 (2 mins. later)	Immediate severe clonic convulsions, pupils fully dilated lasting two full minutes, followed by general twitches.
0.025		Slight twitches of fore paws, spasmodic cry.
	0.23 (10 mins. later)	Very rapid respiration, cry and excitement, feet clonic, then tonic convulsions, dead 4 minutes later.

was seen when caffeine was first injected and absinth administered ten minutes later (see Table V).

We are not prepared at the present to offer any definite explanation for the action of caffeine as we know still very little of its effect on the vascular system of the brain and we are not convinced that its action is primarily a vascular action.

Clinical experience does not seem to help greatly; in cases of migraine with the supposed vasoconstriction, caffeine may bring slight relief for a short time. We made one observation which may be of some interest, and that is the quick onset of *rigor mortis*

which appeared in one of our animals 5 minutes after death, with complete rigidity of the whole body 10 minutes later.

The action of adrenalin as a convulsant agent is even less well known than that of caffeine. Very little or practically nothing can be found in the literature on the subject. Adrenalin is used for pharmaco-dynamic studies of the autonomic system, and one of us (J. N.) has been studying its effects on a group of cases with convulsive states. We used adrenalin intravenously in order to obtain the whole and immediate effect. We will not refer here to

TABLE III.

EFFECTS OF INTRAVENOUS INJECTIONS OF ADRENALIN IN CATS.

Dose per pound of body weight in cc. of 1 to 1000 solution.	Effects.
0.055	Pupils dilated, tonic in fore limbs, pupils return to normal.
0.066	Pupils dilated, tonic extension of limbs, walking movements, excitement, pupils to pin point.
0.088	Respiration slow and shallow, pupils dilated, respiration increasing, 3 minutes later rapid and panting.
0.11	Pupils dilated, cry, panting, first clonic then tonic extension of limbs, decreased respiration, gasp, 2 minutes later asphyxial convulsion, with artificial respiration, massage of heart and saline intravenously (10 cc. twice) pupils less dilated 28 minutes later. 35 minutes later spontaneous gasps; 42 minutes later contraction of pupils and respiratory gasp followed by pupilary dilatation; 43 minutes later reflexes in upper extremities present.

the reactions of the autonomic system as this will be the subject of a later report. but we will mention here the fact that not in a single case have we seen convulsive effects when adrenalin was injected intravenously, even in relatively large doses of $\frac{1}{2}$ mlg. It is true that the autonomic reactions were at times very alarming. The results of our experiments on cats are somewhat different. Although no definite convulsions were obtained from injection of adrenalin in these animals, yet there were in some instances clonic and tonic movements. Probably the doses in the animals were relatively higher than those we used in man. If we look at Table III we see that 0.055 cc. of adrenalin solution 1 to 1,000

per pound of body weight produced tonic movements. With a
larger dose of 0.11 cc. clonic and tonic extension of the limbs was
noted; and again in all instances signs of disturbances of the func-
tion of the autonomic system were noted. The administration of
smaller doses had no fatal reaction. With a large dose 0.4 cc. fol-
lowed by 0.5 cc. one animal died in 15 minutes. It was possible
to revive the cat with artificial respiration, massage of the heart
and intravenous injection of 0.9 per cent sodium chloride solution.

The combined action of adrenalin and absinth is very pro-
nounced. Even in small doses absinth (0.035 cc.) combined with

TABLE IV.

COMBINED EFFECTS OF INTRAVENOUS INJECTIONS OF ABSINTH AND
ADRENALIN.

Dose of absinth per pound of body weight in cc.	Dose of adrenalin per pound of body weight in cc.	Effects.
0.03	0.1	Pupils dilated to extreme, twitches in fore limbs and eyeballs, increased lachrymation.
0.035	0.1	Pupils dilated to extreme followed by five generalized convulsions, pupils still dilated after 10 minutes.
0.03	Unknown	Severe clonic convulsions, tonic extension followed by clonic of jaw, opisthotonos, twitching of eyeballs. Convulsion lasting 10 minutes.

adrenalin (0.1 cc.) produced severe and long continued convul-
sions, terminating fatally in one case (see Table IV). Finally
when a small dose of absinth, caffeine and adrenalin is injected
simultaneously the convulsions are even more severe, quicker in
onset, lasting longer and fatal (see Table V).

We have no wish to add to the present controversy over adre-
nalin and we, therefore, express no opinion as to how or where
it acts.

Since our knowledge of the action of either caffeine or adrenalin
has not passed beyond the stage of controversy, attempts to ex-
plain mechanism of their action in the production of convulsions
would be somewhat premature. One thing may, however, be said
concerning the combined action of adrenalin and caffeine, used

either separately or together, and absinth, and that is, the effects of two or more stimulating agents may be summed up in the nerve cells. The physiologists of a previous generation, *e. g.*, Newell, Martin, recognized the fact that some force or agent of some kind must act upon a cell to set it into activity. Work must be done in the process of excitation. We have recognized the fact that, in a nerve fiber, not all the work need be done at the same time,

TABLE V.

COMBINED EFFECTS OF INTRAVENOUS INJECTIONS OF ABSINTH, CAFFEINE AND ADRENALIN IN VARIOUS COMBINATIONS.

Dose of absinth per pound of body weight in cc.	Dose of caffeine per pound of body weight in grains.	Dose of adrenalin per pound of body weight in cc.	Effects.
	0.15		Tonic extension, pads of feet moist, pupils slightly dilated.
0.01 (10 mins. later)			Excitement, gasping, pads wet.
0.015 (10 mins. later)			Clonic convulsions, pupils fully dilated, tonic extension at very first, convulsions uninterrupted until dead.
0.03	0.1	0.1	Immediate, several generalized convulsions lasting 3½ minutes. Dead.

although it must all be done at the same place. This is the basis of our conception of the summation of stimuli. It does not seem necessary to have all the work of stimulation done by the same agent, either physical or chemical. We find in the literature statements to the effect that certain agents increase the excitability of nerve fibers or nerve cells. What we really mean is that one agent does a part of the work necessary for stimulation, and thus decreases the amount of work that must be done by the other. There is a summation of the effect of carbon dioxide and of afferent nerve impulses in the ordinary movements of respiration.[8] What-

ever their manner of action, caffeine and adrenalin do a part of the work necessary for excitation of the cells of the central nervous system, and thus decrease the amount of work that must be done by the absinth. Bürgi[9, 10, 11, 12] has expressed essentially this conception in his synergistic law. He has shown that two drugs of the same group like narcotics of the methane series produce a summation of action when given together provided they have the same point of attack (Angrifspunkt). When, however, the drugs belong to different orders (sulfonal and scopolamin) their pharmacological effect is even stronger, he calls it the " Potentierende Wirkung " but adds, however, that it does not always mean a multiplication of the action but only an intensification, however, greater than summation.

The number of known anti-convulsant agents is rather limited. A few of them have found wide use in the treatment of convulsive disorders. Among them bromide is the oldest; phenobarbital has been used in the last 15 years.[13, 14] More recently, borates have been found to have antispasmodic properties. Their first use was due to Gowers.[15] In animal experimentation bromide is said to have been used by Albertoni in 1879 and Rovighi and Santini at about the same time. Albertoni quoted by Luciani as having showed that if potassium bromide is administered to dogs for several days in succession, the electrical excitability of the cortex is so much reduced that even strong currents fail to produce an epileptic attack. This author is said by Luciani to have also shown that when successive or lethal doses of quinine are injected into dogs previously treated with bromide, convulsions are not evoked. When atropine is administered, the convulsions following injections of quinine are severe. The reference quoted by Luciani[16] was read in the original by one of us and nothing was found in Albertoni's work concerning any experiments with potassium bromide in any of the animals experimented upon, nor any of its alleged effects on experimentally produced convulsions. Albertoni also did not report any experiments he himself made with quinine. This is, probably, a mistake for this work seems to have been done by Rovighi and Santini.

Rovighi and Santini[17] found that bromides reduced or abolished the convulsions arising from the injections of picrotoxin, while atropine increased them.

Our investigation along these lines consisted of two types of experiments. In one (Table VI) cats were injected intravenously with various concentrations of sodium bromide followed by injections of absinth about three or four hours later. The reactions in these cats were identical with those observed when absinth alone is used. Intravenous injection of bromide does not abolish the effect of absinth. Our general impression is that the lethal dose of absinth may be somewhat smaller after injection of bromide.

TABLE VI.

EFFECT OF INTRAVENOUS INJECTION OF SODIUM BROMIDE UPON RESPONSE TO ABSINTH.

Bromide in grams per pound of body weight.	Absinth in cc. per pound of body weight.	Effect.
0.14	0.021	Twitches.
	0.028	Twitches.
	0.035	Twitches, cries.
0.25	0.02	No reaction.
	0.03	Twitchings, cries.
	0.035	Twitchings, nystagmus.
	0.04	Clonic convulsion.
	0.05	Tonic extension, death.
0.3	0.02	Transient excitement.
	0.025	Transient excitement.
	0.03	Rapid respiration, cries.
	0.035	Cries, twitches, rapid respiration.
	0.04	Tonic extension, death.
0.38	0.04	Tonic extension, few clonic twitches, death.

Sub-convulsive doses of absinth gave the usual respiratory manifestations.

The second group of experiments consisted of feeding a number of cats with a preparation called " Sedobrol," which contains sodium bromide, sodium chloride, proteins, fats and spices. This preparation was given to the cats with their food daily, each one receiving a definite daily amount of bromide.

We fed one cat with 0.55 gram of bromide daily for 21 days and three cats with 1.1 bromide daily for 7, 15 and 21 days, respectively.

The first cat (Table VII) showed a decreased reaction to absinth as the dose of 0.046 absinth per pound gave really little convulsive effect, though it was lethal. In the other cats fed seven days or longer with 1.1 bromide daily, we had practically the same results. Low doses of absinth had hardly any effect; doses which usually give severe convulsions produced only slight convulsive manifestations in our cats.

TABLE VII.

EFFECT OF FEEDING BROMIDE UPON RESPONSE TO ABSINTH.

Daily total dose of bromide in grams.	Days fed.	Absinth in cc. per pound of body weight.	Effects.
0.55	21	0.028	No reaction.
		0.033	Few twitches.
		0.040	Twitches, some tonic effect but no real convulsion, death.
1.1	7	0.020	Rapid respiration.
		0.025	Slight twitches.
		0.030	Tonic extension, cries, death.
1.1	15	0.020	Excitement, cries.
		0.036	Twitches.
		0.040	Tonic extension, death.
1.1	21	0.036	No effect.
		0.036	No effect.
		0.040	Dilated pupils, occasional twitch.
		0.045	Dilated pupils, twitch.
		0.050	Cry, tonic convulsion, respiratory gasps, death.

We feel, therefore, that only a more or less prolonged administration of bromide may affect the convulsive action of absinth.

BIBLIOGRAPHY.

1. Pike, F. H., Osnato, M., and Notkin, J.: The Combined Action of Some Convulsive Agents in Small Doses, and the Action of Bromide in Experimentally Induced Convulsions. Proceed. Assoc. for Res. Nerv. & Ment. Dis. (In Press.)
2. Osnato, M., Killian, J. A., Garcia, T., and Mattice, M. R.: Comparative Chemical Studies of the Blood and Spinal Fluid in Epilepsy. Brain, 50: 581, 1927.

3. Rosett, J.: The Mechanism and the Fundamental Cause of the Epilepsies. Arch. Neurol. & Psychiat., 9: 689, 1923.
4. Cushny, A. R.: Pharmacology and Therapeutics, Lea and Febiger, Philadelphia & New York, 8th Ed., 1924.
5. Karger, P.: Neure Gesichtspunkte in der Behandlung Epileptischer Kinder. Deut. Med. Wochenschr, 50: 1531, 1924.
6. Pethe, F.: Die Wirkung von Sacerdin bei epileptischen Anfällen. Budapesti orvosi usag (Hungarian), 23: 255, 1925.
7. Peritz, G.: Ueber den Herzkrampf im Rahmen der Spasmophilie. Ztschr. f. d. ges. Neurol. u. Psychiat., 102: 395, 1926.
8. Pike, F. H., and Coombs, H. C.: The Organization of the Nervous Mechanism of Respiration. Science, 56: 691, 1922.
9. Bürgi, E.: Ueber Arzneigemische und ihre Wirkungen. Ztschr. f. Experim. Path. Ther., 18: 23, 1916.
10. Bürgi, E.: Die Arzneigemische. Handbuch d. Prakt. Ther. als Ergeb. Experim. For. Herausg. v. von den Velden u. Wolf. Leipzig, 1: 197, 1926.
11. Bürgi, E.: Ueber die Pharimakalogische Bedeutung der Arzneigemische. Ergebn. d. Inner. Med. u. Kinderh., 23: 556, 1923.
12. Bürgi, E.: Ueber den Synergismus der Arzneien. Fortschr. d. Ther., 4: 205, 1928.
13. Notkin, J.: A Contribution to the Subject of Epilepsy with Especial Reference to the Literature. Journ. Nerv. Ment. Dis., 67: 321, 1928.
14. Notkin, J.: Chloride-Bromide Treatment of Epilepsy. Arch. Neurol. & Psychiat., 21: 165, 1929.
15. Gowers from Crouzon, O.: Le Syndrom Epilepsie. Paris, 1929.
16. Luciani: Anali Universale di Medicina e Cluringia, 249, 1879.
17. Rovighi et Santini: Sur les Convulsions Epileptiques par les Poisons Arch. Ital. d. Biol., 2: 278, 1882.

NOTE.—Since this paper was written, it has been shown (Coombs, Wortis and Pike, Bulletin of the Neurological Institute of New York, I, 145, 1931) that bilateral adrenalectomy decreases the resistance of cats to absinth.

DO PERSONALITY TYPES EXIST?*

By HEINRICH KLÜVER, Ph. D.,
Behavior Research Fund, Chicago.

It can be easily shown that in studying personality types we are concerned with some of the most intricate problems of psychology. A first attempt at an analysis of the difficulties involved, shows that we are dealing here with at least three groups of problems; (a) with problems as discussed, *e. g.*, by Heymans in his paper on typological and statistical methods in psychology;⁴ (b) with problems which at the Eighth International Congress of Psychology were considered to be of fundamental importance, the problems of "understanding" and "explaining" in psychology, *i. e.*, with the problem of a "cultural science psychology" as opposed to a "natural science psychology";¹⁶ (c) with investigations in the field of temperament and character.⁹ It is not surprising, therefore, that in spite of thousands of publications, progress in the study of personality types is relatively slow. Of course, if all attempts at clarifying the issues and separating theoretical and experimental, methodological and factual questions are rejected as "mere theory," progress must necessarily be slow. The reasons for rejecting such attempts as theory are rather obvious, at least in those cases in which investigators, who believe that their contributions advance our knowledge of personality rapidly, must be told that their work, no matter how valuable in other respects, has no bearing whatsoever on the problems of personality study. To illustrate: Devising an introversion-extraversion scale does not necessarily clarify any of the issues involved in the introversion-extraversion problem. At any rate, we consider it of paramount importance that the issues involved in the study of personality types should be clearly stated and that such statement, such "theorizing," will be more fruitful than busily "collecting data."

The core of the whole problem lies in the question: Do personality types exist? We have previously tried to answer this question by a critical analysis of different researches bearing on the type problem, illuminating in this way the complexity of the problem from different angles.[6, 7, 8, 9, 10, 11] At present we are not interested in presenting the complexity of the problem from all angles, but in attempting a clear-cut answer to the above question, evolving the reasons *pro et contra* the existence of personality types.

There seem to be some weighty reasons for assuming that *personality types do not exist*.

(a) They do not exist since it is not permissible to pick out summit points and central tendencies in a frequency curve and change them into such entities as " types." It is essentially the same procedure that has, as Boas[1] points out, led to the assumption of distinct " races." " The more uniform a people the more strongly are we impressed by the 'type.' Every country impresses us as inhabited by a certain type, the traits of which are determined by the most frequently occurring forms."[1] The conceptionalizing of everyday experiences into a racial " type " does not give us any information concerning its hereditary composition and the range of its variations. It is true, furthermore, that in psychology nothing is gained by hypostasizing tendencies towards bi- or trimodality.

(b) There is no reason for assuming the existence of " types " if what we are actually considering are the extreme cases in a distribution. Again and again the attempt is made to consider such extremes as types. Why introduce the concept of a " schizothymic " and a " cyclothymic " type if the situation may be stated thus: " The deviations in personality that constitute the symptoms of the insanities and that determine the 'temperaments' may be conceived as ranging from extreme schizoid characteristics on the one hand to extreme manic-depressive characteristics on the other. . . . ."[12] In view of such facts we must discard the concept of " types " and consider as the only scientific procedure the search for quantitative statements expressing the behavior of the characteristic we happen to deal with.

(c) Again, it is not necessary to introduce the concept of " type " if we are not concerned with single frequency distribu-

tions but with relationships between certain traits, attitudes, etc. It seems clear that the problem of the coexistence of certain traits is adequately handled by the method of correlation. In case certain physical or mental traits correlate highly, the assumption of a type does not add anything to our knowledge of the relationship found. A person always fits into one or the other " complex group of mathematically related psychic factors." [2]

(d) The statement that there are " typical " ministers, officers, Englishmen, or men of a feminine type, should be nothing but an incentive for doing some research on the process of " typification." " Types " do not exist, but processes of " typification " occur. Objects and events, humans and animals are constantly " typified " in our dealings with them. The " typical " Englishman and the " feminine type " are clearly the products of prescientific thinking. Yet the problem exists as to the mechanisms involved in such a naive " typification." Georg Simmel has tried to analyze the ways in which we observe " typically " in everyday life.[3] He points out *first* that a perfect understanding of other individuals is impossible owing to the fact that two individuals are never alike in all respects. Thus we generalize in our contacts with others. We constantly modify the impressions we receive from others and classify individuals on the basis of certain similarities and dissimilarities. In such a way certain factors are neglected while others are unduly stressed. The result is a " type." Simmel believes that a *second* point is to be taken into consideration. A man is not only judged in terms of his overt behavior, but also in terms of his potentialities. We form a picture " which he would represent if he were, so to speak, completely himself." In the *third* place we belong to certain social groups. We belong to social circles held together by similar work or similar interests. In a group of executives or officers, for instance, a person is never viewed " entirely empirically," but always in terms of the group. A person who comes to know a minister may only with difficulty free himself of the tendency to judge the other one in terms of his profession. Simmel's analysis, although by no means complete, supports the view that psychological types are not grounded in reality but in our habits of observing " typically." A psychology, not of types, but of the

processes involved in typification, seems to be all that is left of the assertion that personality types exist.

We have now to consider the claim that *the concept of types cannot be dispensed with.*

To understand the following it is necessary to appreciate the central position the concept of type has in the work of Jung, Rorschach, E. R. and W. Jaensch, Kretschmer, Spranger, and others. It is claimed that personality types exist since in psychology we must admit, *e. g.,* the existence of two different modes of adaptation to the world (Jung) ; two " psychological vegetative systems " the first of which appears to be chiefly dependent on the cortex, the second one on the subcortex (W. Jaensch) ; differences in the attitudes of individuals to the manifestations of cultural life, such as " science," " art," etc. (Spranger) ; differences in constitutional organization expressing themselves in body build and character (Kretschmer) ; dominant dispositions of a psychic or psychophysically-neutral kind (W. Stern), etc. By speaking of " types," then, these investigators point to such phenomena as " interaction of psychological functions constituting a special mode of adaptation to the world " ; " psychophysical vegetative system " ; " *the* fundamental psychological function " ; " dominance of one value " ; " dominance of a psychic or psychophysically-neutral disposition " ; etc.

Thus the claim that types exist implies that personalities are viewed with respect to their " essential characteristics " or " one fundamental characteristic." Examining the nature of this fundamental characteristic in different type psychologies, we find that a " type " always reduces a set of diverse phenomena to one formula. The fundamental characteristic called " type " merely expresses the fact that the investigator has succeeded in transforming disconnected bits of behavior into a dynamic system, the interrelations of which are intelligible to a certain extent. If the facts known about after-images, eidetic images, and memory-images of certain individuals are viewed from a certain angle, and if these " bits " of behavior are connected with other " bits "—somatic findings, data concerning the intellectual and affective life of these persons—the " integrated " type of E. R. Jaensch arises. This integrated type exists as certain as the curves expressing the behavior of after-images or the curves expressing other behavior

items exist. It does not merely exist as a device for summarizing certain results; heterogeneous bits of behavior are linked up in terms of one fundamental characteristic: the " typical " characteristic of " integration." " Integration " refers to special modes of interacting in the organism. It means more than the assumption that certain traits coexist. It means that certain modes of interacting are *empirically* existent. If we find, *e. g.,* that both the visual perceptions and the visual memory-images of certain persons are characterized by a certain " lability," we have found this characteristic to be present in two fields which are, as is evident from a large number of investigations, related in many specific ways.

We may say, then, that in assuming typical characteristics we go beyond the description of coexistent behavior items and assume that certain modes of interaction are empirically existent.

We have shown, perhaps somewhat briefly, what is implicit in the assumption that types exist. No doubt, much of what has been said here is not clearly recognized by some of the investigators employing the concept of types. We shall sum up the results of our analysis by stating them from a somewhat different angle: (a) The " types " as used in modern psychology represent dynamic systems with specific modes of interaction; (b) in some cases, the specific modes of interaction are hypothetically assumed, subsequent research being necessary for verification; (c) the methods for verifying types depend on the " fundamental characteristic," *i. e.,* on the nature of the " type " proposed—for instance, the methods of neurology, sensory physiology, or biochemistry, etc., may be used; (d) the fact that certain types are inconsistent with certain empirical findings does not imply that " types " must be discarded, it may merely call for a modification of the type proposed; (e) types, as Stern rightly points out, can never be arrived at by mere collecting of data, but by working them up from certain angles.

So far we have shown that the existence of types is claimed because of the existence of certain " fundamental characteristics " found in studying personality. It seems that in the psychobiological field investigators discover again and again certain behavior units which cannot be properly described, not to mention explained, by using the scientific methods available. It is true that certain

51

kinds of behavior cannot be approached by using exact methods. But does behavior of such kind not exist? It does exist, and it is frequently considered to be of paramount significance for psychology. If the methods available are not applicable to certain facts of behavior, these facts force us to look for new methods. Since psychologists could not help finding certain modes of psychological functioning, they evolved the concept of types. It is certain that not only the physico-chemical relations found in the adaptive behavior of animals enjoy scientific existence, but that adaptive behavior itself exists—if not " scientifically," at least, it exists. It is certain that Jung's modes of adaptation to the world, introversion and extraversion, exist in spite of the non-existence of, e. g., mathematical findings concerning these adaptive processes. At any rate, it is certain that modes of adaptation to the world exist.

We must admit that behavior and different modes of behavior are of primary interest to the psychologist. Reliable information about the complexities of animal behavior must be considered as valuable as, e. g., the discovery of a tropism with only a narrow basis in behavior. There are phenomena which can be handled quantitatively from the very beginning. There are other phenomena which can only be adequately dealt with by a typological psychology. We believe that " typological psychology " and " quantitative psychology " rightly understood are not antagonistic to each other. As regards the quantitative treatment of behavior we shall quote Crozier at some length: " By ' quantitative ' one does not wish to imply simply that which has to do either with numbers of observations or of animals (there are weird and lovely instances of even this in the literature!) nor yet merely numerical data which may be submitted to statisticoid jugglery. One *does* indicate, rather, numerical data which may be submitted to analysis in terms of intelligible theory; the ' quantitative ' has significance in the light of functional interrelationships which the analysis may reveal, and of the tests which it suggests." [2] Thus, it seems that the differences between quantitative and typological psychology are rather slight; they are chiefly differences in the *material* handled. Both quantitative and typological psychology submit their data to analysis " in terms of intelligible theory." The data of typological psychology, however, are not necessarily

numerical; to be sure, in most cases they are not numerical. The aspects of behavior treated in the field of quantitative psychology are different from those selected for treatment in the field of typological psychology. Consequently, different concepts have been evolved in these two fields for describing the relations found. Since in either field quantitative methods may be used, the plea for a type psychology made by several investigators is not necessarily a plea *contra* quantitative methods.

The merits of any quantitative method cannot be questioned. But in the days of statisticoid jugglery, to use Crozier's term, it may be worth while to point out that " types " also have their merits. It may be said: (a) that in view of the aspects of behavior considered here, types are more " exact " than quantitative methods; (b) that in contrast to the modern tendency to unify even such situations in which disparate variables are clearly indicated, types are superior in arriving at causal relations.

Of course, only quantitative methods prove that the difference between a moron and a genius is merely a " quantitative " one and that we must assume a " progression " from extreme schizoid to extreme manic-depressive characteristics. It seems, however, that results gained in such a way frequently do not throw light on basic mechanisms in behavior or suggest promising " leads " for further work. Moreover, the results of previous investigations showing clearly, for instance, that disparate variables are involved, are obscured by an almost vicious, not to say philosophical, tendency to quantification and unification. Somebody interested in those aspects of behavior considered by a typological psychology might argue that it is not enough to show in a given case the *possibility* of quantifying and unifying certain aspects of behavior by introducing distribution curves, psychoid phenomena and other " -oid " phenomena, but that some evidence must be presented for proving the *necessity* of such a treatment. In fact, we seem to resort to statisticoid jugglery whenever the quantitative approach does nothing but obscure known facts or cannot be considered fruitful on the basis of theoretical considerations or the experimental work done.

To sum up: The reasons given above *contra* the existence of types are of no significance in case we concern ourselves with " types " as defined in modern psychological work. The great

interest in types is an expression of the fact that behavior units comprising disparate variables are the chief concern of many psychologists. Since such behavior units exist, a "typological psychology" must be developed.

BIBLIOGRAPHY.

1. Boas, F.: Anthropology and Modern Life. New York: Norton & Co., 1928. Pp. 246.
2. Crozier, W. J.: Tropisms. J. Gen. Psychol., 1928, 1, 213.
3. Giese, F.: Das Ich als Komplex in der Psychologie. Arch. f. d. ges. Psychol., 1914, 32, 120.
4. Heymans, G.: Typologische und statistische Methode innerhalb der speziellen Psychologie. Scientia, 1927, 42, 77.
5. Jaensch, E. R.: Ueber Methoden der psychologischen Typenforschung. Zsch. f. Psychol., 1928, 108, 1.
6. Klüver, H.: Psychological and Sociological Types. Psychol. Rev., 1924, 31, 456.
7. Klüver, H. The Problem of Type in "Cultural Science Psychology." J. Phil., 1925, 22, 225.
8. Klüver, H.: M. Weber's "Ideal Type" in Psychology. J. Phil., 1926, 23, 29.
9. Klüver, H.: An Analysis of Recent Work on the Problem of Psychological Types. J. Nerv. & Ment. Dis., 1925, 62, 561.
10. Klüver, H.: Contemporary German Psychology. In Murphy's "An Historical Introduction to Modern Psychology." New York: Harcourt, Brace & Co., 1929. Cf. pp. 417-455.
11. Klüver, H.: Typological Method: E. Kretschmer's Study of Physique and Character. Cf. pp. 176-185 in Methods in Social Science, edited by Stuart A. Rice. The University of Chicago Press, 1931.
12. Mohr, G. J., and Gundlach, R. H.: The Relation between Physique and Performance. J. Exper. Psychol., 1927, 10, 117.
13. Simmel, G.: Soziologie. Leipzig: Duncker & Humblot, 1908. Pp. 782.

THE RELATION OF TIME OF DAY, SLEEP, AND OTHER FACTORS TO THE INCIDENCE OF EPILEPTIC SEIZURES.

By FREDERICK L. PATRY, M. D.,

Utica State Hospital, Utica, N. Y.

The purpose of this paper is to report an investigation of a study of 31 adult patients exhibiting major convulsive states from July 1, 1927, to June 30, 1928. The study included all the patients having fits on a semi-acute male service of 750 patients. It is obvious that no final conclusions can be formulated from the study of so small a number. However, the result of this study seems to indicate several important correlations, coincidences and inferences which suggest some practical applications. It is hoped that the problems and questions arising from this study may be helpful to those who are studying paroxysmal disorders and arouse a spirit of interest and investigation in others who have not given this problem much concern.

The author is indebted to Langdon-Down and Brain[1] who recently reported an investigation of the time of day in relation to convulsions in epilepsy. To make this study more valuable a similar method of approach is used in part.

The patients comprising this study lived under similar conditions and all but four were treated on the same ward. The hour of occurrence, both day and night, of every major convulsion was noted and recorded throughout the year; there were 1013 fits in all. Several other factors which concerned each patient are tabulated and discussed below.

All but four patients were examples of so-called idiopathic or essential epilepsy—that is to say, they exhibited recurring convulsive states with no clinical evidence of focal organic disease of the nervous system and in which there was uncertainty regarding the factors causing it. Of the four cases not so diagnosed, three were examples of psychosis with cerebral arteriosclerosis and one was diagnosed brain tumor. Since the type of seizure in these latter cases differed in no essential from the idiopathic ones, they were retained in the total group studied.

It has long been known that convulsive states are more prone
to occur at certain times of the day than others and that various
explanations have been sought and given for this phenomenon.
Many years ago Gowers [2] made a comprehensive study of a large
number of epileptic and convulsive disorders with special attention
to the time of day of the seizure. A comparison, in part between
some of his findings and those of Langdon-Down and Brain's series
is made with the present study.

CLASSIFICATION.

For purposes of classification and discussion the patients were
grouped into three types: (a) *Diurnal*—those whose attacks were
predominantly in the day time (between 6.00 a. m.-8.00 p. m.);
(b) *Nocturnal*—those whose convulsions were mainly nocturnal.
Patients were not so classified unless over twice as many fits
occurred at night than by day. The same criterion also applied to
the diurnal group. (c) *Diffused*—those whose attacks occurred
at any time during the 24 hours, both day and night.

INCIDENCE OF TYPES.

The relative frequency of seizures in the three groups is given
in Table I. The close correlation between Gower's and Langdon-
Down and Brain's series is interesting.

TABLE I.

Type.	Per cent of total (Gowers).	Per cent of total (L-D—Brain's).	Per cent of total (present series).
Diurnal	45	42.5	45.2
Nocturnal	22	24.2	19.3
Diffused	33	33.3	35.5

Table II shows the incidence of the three types of patients
grouped according to the duration of the disease. This latter factor
appears to have some significance as to the type of time distribution.

TABLE II.

Type.	Duration under 10 years. Percentage.		Duration 10-20 years. Percentage.		Duration over 20 years. Percentage.	
	L-D—Brain's.	Present series.	L-D—Brain's.	Present series.	L-D—Brain's.	Present series.
Diurnal	47	62.5	40	40	36.0	38.9
Nocturnal	28	0	20	20	21.5	27.8
Diffused	25	37.5	40	40	42.5	33.3

It will be seen that the longer the duration of the disease up to 20 years the greater is the proportion of the " diffused " type as compared with both the " diurnal " and " nocturnal " types. Unlike Langdon-Down and Brain's series, however, after 20 years, there is a tendency for both the diurnal and nocturnal types to have a greater incidence than the diffused type, the diurnal more so than the nocturnal. There is thus a tendency for time to convert the diffused type after 20 years into the diurnal and nocturnal types. Nevertheless, after 20 years, one-third remain in the diffused group.

The close correspondence between the three different series of cases reported with respect to the different types and their persistence throughout the entire illness or many years thereof, suggests that there exists a basic distinction between the individuals composing the respective groups. This distinction appears to depend upon many factors, very important among them being the factor of sleep. This aspect will be elaborated further on in the discussion.

RELATIVE SEVERITY OF THE DISORDERS IN THE DIFFERENT TYPES.

In the *diurnal group* were 14 patients having an average of 35.9 fits per patient for the year. In the *nocturnal group* there were six patients with an average of 36.7 fits per patient. In the *diffused group* there were 11 patients with an average of 26.4 fits per patient. Estimated thus we see that the severity of the disorder is greatest in those whose fits are mainly nocturnal and diurnal and least in the diffused group. Since the nocturnal occurrence of fits is common to the diffused, nocturnal and diurnal groups, it may be said that the regular occurrence of nocturnal fits and to a somewhat less degree, diurnal fits, is a sign of poor prognosis. The poorer prognosis for these two types is further supported by the findings reported in Table II, which shows that after 20 years there is a tendency for both the nocturnal and diurnal types to have a greater incidence than the diffused group.

Perhaps biochemical and physiological aberrations play a greater rôle in the diffused type. This is suggested by Table III wherein we note that 50 per cent and 58 per cent of the diffused type craved salt, and milk or meat respectively, as compared with 25 per cent and 12.5 per cent who craved salt in the diurnal and nocturnal

group, and 14.2 per cent and 28 per cent who craved milk or meat. Excitement such as entertainment, altercations, disappointments, etc., played a much larger rôle as a precipitant of fits in the diurnal (46.1 per cent) and nocturnal (50 per cent) types than in the diffused group (18.1 per cent). This suggests that psychogenic factors, especially of an emotional kind, play a larger rôle in precipitating the nocturnal and diurnal types. The nocturnal group showed 83.3 per cent mentally unstable as compared with 72.7 per cent of the diffused, and 50 per cent of the diurnal group.

Table III shows an additional number of differences in the various types. The significance of many of the findings is not clear, but several leads are suggested. No attempt is made to discuss fully their significance, it being hoped that the data presented might suggest further lines of investigation to the reader.* The following comments are offered:

The diurnal group was somewhat more intelligent than the nocturnal and diffused group, having a mental age, actual or assessed, of 13.2 years, compared with 12.6 and 12.2 years of the other two groups respectively. It suggests that mental deterioration is less rapid in the diurnal than in the other two types. It may also be related to a less degree of mental instability in the diurnal group.

Since the keynote of medicine today is to lay emphasis on the prevention of disease, it is well for us to do all in our power to remove possible pathogenic influences. Excitement in the form of unwise visiting, entertainment, altercations, disappointments, etc., was a precipitant of fits in 46.1 per cent of the diurnal group, 50 per cent of the nocturnal and 18.1 per cent of the diffused group. Masturbation appeared to bear no causal relationship to fits. Adequate supervision and foresight might remove a large percentage of this exciting factor.

Asthenic and dysplastic physical constitutional types' predominate in the diurnal and diffused groups, whereas the pyknic type was more frequent in the nocturnal group. The latter finding might be related to the greater tendency to emotional oscillations found in this series.

One would expect a somewhat higher blood pressure in the nocturnal group in view of their older age. This condition might be

* References are given wherein the reader will find a fuller discussion of the various factors involved.

TABLE III.

Item investigated.	Diurnal.	Nocturnal.	Diffused.
Mental age	13.2 yrs.	12.6 yrs.	12.2 yrs.
Mental instability	50.0%	83.3%	72.7%
Excitement as a precipitant of fits....	46.1%	50.0%	18.1%
Physical habitus:			
Asthenic and dysplastic	85.7%	16.7%	54.5%
Pyknic	14.3%	83.3%	45.5%
Blood pressure:			
Av. systolic	136.0	155.0	137.0
Av. diastolic	102.5	102.6	90.5
Av. pulse pressure	45.2	50.7	46.0
Duration of psychosis	6.3 yrs.	8.2 yrs.	10.3 yrs.
Age incidence:			
Av. at present	41.0 yrs.	51.5 yrs.	53.4 yrs.
Av. at time of onset of convulsions.	18.7 yrs.	19.2 yrs.	27.0 yrs.
Alcoholic	63.0%	75.0%	71.4%
Abstinent	27.3%	25.0%	28.0%
Syphilitic (systemic)	9.0%	0.0%	0.0%
Type of convulsion:			
Both single and serial	85.0%	66.6%	72.7%
Single only	7.1%	16.0%	18.2%
Single, serial and status	7.1%	16.0%	9.1%
Time interval of fits:			
Av. shortest interval	136.0 min.	122.0 min.	63.3 min.
Av. average interval	24.0 days	24.0 days	33.0 days
Av. longest interval	94.1 days	80.7 days	83.7 days
Craved salt	25.0%	12.5%	50.0%
Craved mik or meat	14.2%	28.5%	58.0%
Avaricious appetite	28.5%	33.3%	28.5%
Constipated	45.4%	50.0%	50.0%
Aura:			
No aura	34.6%	100.0%	10.0%
" Subjective "	40.0%	16.6%	40.0%
" Objective " (pre-convulsive change			
of behavior)	60.0%	83.3%	60.0%
Av. duration	24.3 hrs.	16.7 hrs.	14.8 hrs.
Av. duration of post-convulsive			
stupor	71.2 min.	65.0 min.	64.4 min.
Routine workers	100.0%	50.0%	100.0%
Medicine:			
Bromide helped	14.2%	0.0%	0.0%
Luminal helped	21.4%	0.0%	9.1%
No help	78.5%	100.0%	91.0%

an aggravating factor,[4] increasing cortical irritability and consequently causing a somewhat higher frequency of fits in this group. One might conclude that a high systolic blood pressure and particularly a high pulse pressure are poor prognostic signs with respect to convulsive states.

The diffused type is apt to have a longer psychotic period than the other two types, notwithstanding the older average age of onset of the convulsive state in the diffused type. The latter group is more likely to include the non-idiopathic types (75 per cent in this series). Of the idiopathic group, 18 were diagnosed clouded states, six deterioration and three excitement.

The regular abuse of alcohol appears to occur more frequently in patients of the nocturnal and diffused types.

Patients showing isolated single fits are more frequently in the nocturnal and diffused group. The nocturnal type is more prone to status epilepticus—often terminal. The patients presenting combined single and serial seizures (those having several convulsions within a day or two, with a return of consciousness between attacks) show the greatest incidence.

The diurnal group has the longest interval between attacks, and the diffused group, the shortest. This might have some relation to our finding, viz., that the diurnal group has an average higher intelligence than the other two groups. Thus the greater the frequency of fits, the greater the chance of mental deterioration. The prevention of the occurrence of fits is therefore an obvious corollary.

An endocrine, biochemical or metabolic dysfunction is suggested by the large percentage that craves salt, milk or meat, and in some cases sweets, pudding, molasses, tobacco, etc. These tendencies were definitely higher in the diffused group and yet their average incidence of seizures is less than in the other two groups. This type of food craving might be the result of a metabolic disturbance which is prejudicial toward fits. The avaricious appetite seen in some patients, especially a day or so before a seizure, might have a similar significance, although emotional instability during this phase is a large predisposing factor. The body in some cases reestablishes a more stable biochemical balance, as is shown by a decrease in the number of fits with increasing age. Here endocrinological[5] as well as other factors suggest themselves.

It is well known that constipation is a precipitating factor of convulsive states. This tends to support the finding of autointoxication * as an exciting cause. Patients are often quick to discern this condition and realize how free purgation at times tends to abort an attack or make it less severe. The same applies to the post-convulsive state of stupor or confusion. The frequent voluntary request of patients for Epsom salts is an indication of its value in helping to clear up these phases.

Unlike the classical description of epileptic seizures, it was found that a considerable number, especially those of the diurnal and nocturnal types, showed no aura. The latter is less frequently noted than the objective pre-convulsive change in behavior. The combined average duration of the aura and preconvulsive change in behavior is longest in the diurnal and shortest in the diffused type. There was a tendency for the auræ to decrease in duration with the increased duration of the disease.

The average duration of the post-convulsive stupor and confusion was somewhat longer in the diurnal group thus supporting the relatively graver nature of this type.

It is important to note the emphasis placed on regular routine congenial work, especially outside occupations. All, with the exception of 50 per cent of the nocturnal group who are too feeble to work, are daily occupied. Attention to this part of the treatment will give better results than any other single measure.

We see the small rôle of antispasmodics in the prevention of seizures. In speaking with those who cared for epileptic wards about 30 years ago, when bromides were freely used and outside work was not the rule, one is convinced that the less medicine and the more outside congenial work, the fewer will be the attacks. Under such treatment, the patients are more agreeable, less argumentative and combative, experience fewer fits and are more helpful and happier. Sodium bromide appears to be less efficacious in the diffused type, luminal being more helpful here. Generally speaking, luminal is preferable since bromides tend to make the patient dull, sleepy, indolent, lose weight, and consequently show little interest or cooperation for constructive work. But the combined use of luminal and bromide, checked by regular examination of the blood bromide has shown good results as practised by Diethelm.[7]

Seizures of four of the idiopathic group could at times be aborted by shaking and speaking sharply to them just as they were about to enter the convulsive state. Following the interception there would be a confused period averaging three to four minutes.

Urination and defecation during, as well as after, a seizure was of frequent occurrence. The voiding had a definite relation to hastening the clearing up of the stuporous or confused state, and at times this act would terminate this phase.

Nearly all the patients of the idiopathic group showed petit mal as well as the grand mal attacks. The former usually preceded the latter by varying periods of time, but in Table III, the age of onset of convulsions dates from the major seizures.

Amnesia for the fit was shown by nearly all the patients, although some would ask shortly afterward if anything had happened to them recently in view of their uneasy mental state or disheveled appearance.

One of the idiopathic group showed frank symptoms of hysteria such as functional paraplegia, concentric narrowing of the field of vision and various sensory disturbances. This case is mentioned to emphasize the psychic factor which in many patients plays a more or less leading etiological rôle and suggests " complex " material as causative factors as in hysteria.

Time Peaks.

The term " time peak " refers to the fact that if either the attacks of the individual epileptic or the pooled attacks of a group are recorded graphically, the resulting graph presents elevations or peaks which occur at certain hours of the day or night or both. In order to demonstrate this, each group is studied by itself. The study of these peaks marks one of the most interesting phases of the investigation.

Nocturnal Peaks.—The time of incidence of fits occurring in the nocturnal group is represented by the black area in Fig. 1. It will be seen that this maintains a low level during the day, only about 16 per cent of the total fits of this group occurring between 8.00 a. m. and 8.00 p. m. Between 8.00 and 9.00 p. m., the number of fits is over six times as great as in the previous hour and between 9.00 and 10.00 p. m. this rise is continued and intensified to reach the nocturnal peak, N2. During the next hour the number falls a little until between 11.00 p. m. and 12 midnight we have

the highest nocturnal peak, N1. During the next hour the number
falls to nearly one-half ,and between 1.00 and 2.00 a. m. a little
lower. This is followed by a fairly sharp rise to the third nocturnal
peak, N3, between 3.00 and 4.00 a. m. Subsequently, the fall is
more gradual until 6.00 a. m., when the decline becomes precipitate,
then less so until between 9.00 and 10.00 a. m., when there occurs

FIG. 1.—Chart showing the time of distribution of the pooled fits of the
patients in the diurnal and nocturnal groups. The ordinates are percen-
tages of the total number of fits in each group over a period of one year.
The abscissæ are hours of the day. The fits of the nocturnal group are
represented in black, those of the diurnal group in cross-hatching. The
patients arise between 6.00 and 7.00 a. m., the majority retire to bed between
8.00 and 9.00 p. m.

the lowest point within the 24 hours (with the exception of the
6.00 to 7.00 p. m. period). Only one patient showed all three peaks,
two of the others showed both N1 and N3, two showed N2 and
N3 and the remainder showed N3 only.

Diurnal Peaks.—The time incidence of fits in the diurnal group
is represented by the areas of cross-hatching in Fig. 1. Four
diurnal peaks can be detected. The incidence is lowest for the
diurnal group between 5.00 and 6.00 p. m. Thereafter there is
a gradual rise until 10.00 p. m., followed by a slight fall and this

by a sharp incline to the period 12 midnight to 1.00 a. m. A sharp drop then occurs to the second lowest point, between 1.00 and 2.00 a. m. Following this there is a gradual elevation to 6 a. m. when there occurs an abrupt rise to the highest peak D1 between 6.00 a. m. and 7.00 a. m., which was shown by six of the patients. During this hour there occurred 9.7 per cent of the total number of fits of the patients of this group. The fall is almost
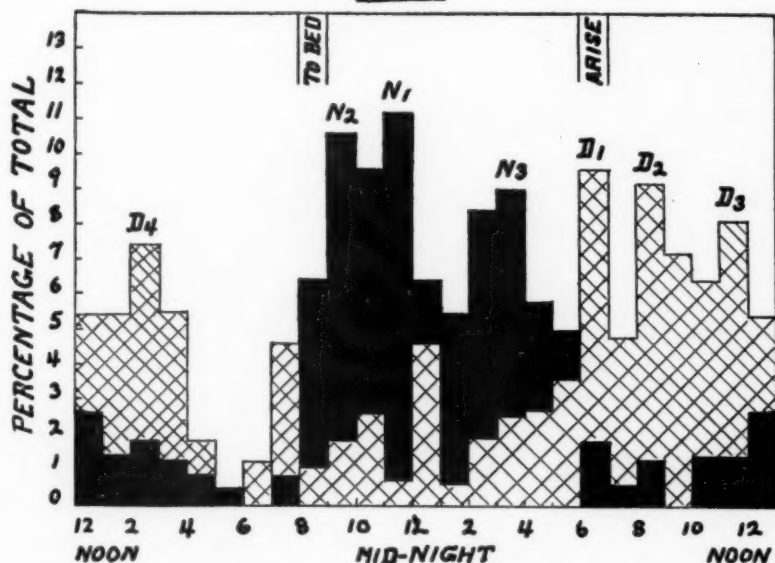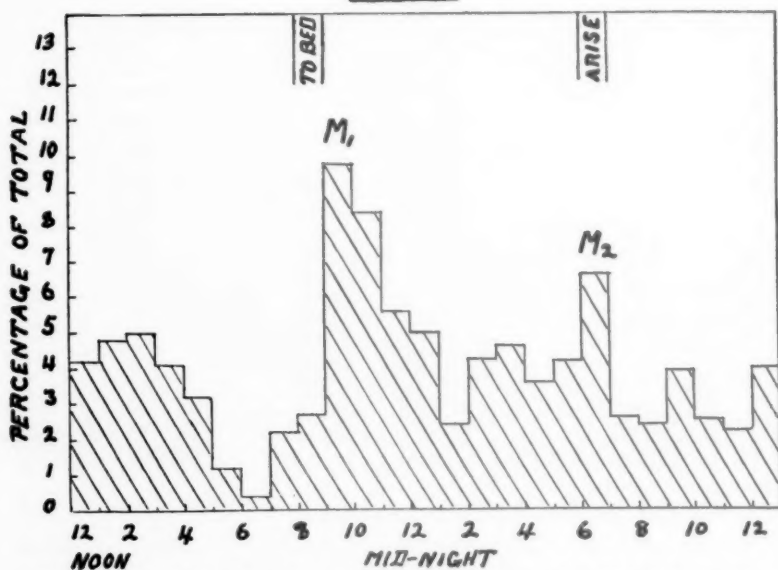

FIG. 2.—Graph showing time distribution of the pooled fits of the patients in the diffused group. The ordinates are percentages of the total number of fits in this group over a period of one year. The abscissæ are hours of the day.

as abrupt as the rise, only to be followed by a sharp elevation to the second diurnal peak, D2, between 8.00 and 9.00 a. m. This peak is followed by a gradual fall to the hour 10.00 to 11.00 a. m., with a subsequent rise to the third diurnal peak, D3, between 11.00 a. m. and 12.00 noon. This is followed by a fairly sharp decline and the level is there maintained until 2.00 p. m., when the 4th diurnal peak, D4, occurs between 2.00 and 3.00 p. m.

Diffused Peaks.—The time incidence of fits in the diffused group is represented in Fig. 2. Examination of the pooled fits of this

group showed the lowest incidence between 6.00 and 7.00 p. m., followed by a gradual rise to between 8.00 and 9.00 p. m., when an abrupt incline occurs to the highest peak, M1, between 9.00 and 10.00 p. m. This is followed by a somewhat sudden fall to the level of 1.00 to 2.00 a. m. with a subsequent rise which is maintained until 4.00 a. m. when a fall occurs between 4.00 and 5.00 a. m. There is then a fairly sharp rise to the second peak M2, between 6.00 and 7.00 a. m. followed by a sharp fall where it remains with the exception of slight oscillations until 5.00 p. m. The level then descends fairly suddenly to its lowest incidence between 6.00 and 7.00. Since M1 is only shown by two of the patients, it is hardly representative of what the majority of the individual charts of this type show, viz., no special time incidence in their attacks which occur indiscriminately at any hour of the day or night.

INTERPRETATION OF THE PEAKS.

It has long been observed that the commonest time for fits and their qualitatively closely allied myoclonic jerks is during the time of transition from sleep to wakefulness and from wakefulness to sleep. Just why this is so is an interesting question which is by no means fully answered at present. Studies such as this might suggest some leads in the explanation of this important fact. We shall now discuss the significance of the various peaks.

Peak N1.—Most of the patients retire between 7.00 and 9.00 p. m. The peak reaches its maximum between 11.00 and 12.00 p. m., which is for some patients the second or third hour after retiring to bed. It seems possible that this peak may represent the response of certain patients, either to the act of falling asleep or to the early stages of sleep itself. The same remarks might be applied to other patients showing the peak N2, occurring between 9.00 and 10.00 p. m., and who perhaps tend to fall asleep sooner than those constituting peak N1.*

Peak N3.—This peak begins to rise at 2.00 a. m. and attains its maximum between 3.00 and 4.00 a. m. It falls rather gradually

---

* Peaks N1 and N2 might be influenced by the air electrical processes * in connection with the geomagnetic fluctuations which have the maximum between 8.00-10.00 p. m. and the minimum toward 4.00 a. m. These hours are also important from the point of view of depth of sleep.

till 6.00 a. m. and then suddenly to 6.00 to 7.00 a. m. These patients arise between 6.00 and 6.30 a. m. so that it might be inferred that the sharp fall corresponds to the period of awakening and getting up. This is in direct contrast to the diurnal group during this time period. The rise of Peak N3 is obviously not due to a tendency of the patients to awaken in the latter part of the night, otherwise the peak would continue to rise until after the time of getting up, whereas the reverse is seen.

Peak D1.—This peak is an abrupt one reaching its maximum between 6.00 and 7.00 a. m., a period beginning with the arising of the patients. It clearly shows that the patients of this group are convulsed by conditions associated with the act of awakening and rising. The earlier part of the rise might be due to the act of awakening and the maximum part of the peak to a deferred effect of awakening. The causes of the peaks D2 and D3 is largely speculative. The former might have some causal relation to changes in posture and circulation consequent to the beginning of work and the latter to biochemical and physiological changes consequent upon the cessation of work and preparation for the noonday meal. The cause of D4 is not clear but may be related to deferred effects of eating and the commencement of work.

Peak M1.—This peak reaches its maximum between 9.00 and 10.00 p. m. and seems to be related to the effect of the act of falling asleep.

Peak M2.—This peak reaches its maximum between 6.00 and 7.00 a. m., and is apparently related to the effect of awakening and arising from sleep. This view is supported by an elevation in the curve the two hours preceding the peak.

Examples of time peaks in individual patients of the three groups are shown in Figs. 3-5.

PERIODICITY OF FITS.

The more or less regular recurrence in time of fits over a period of a year in so many of the patients is striking, and suggests an inherent or acquired constitutional tendency as a basis for this rhythm in incidence. The fact that the rhythm is irregular at times, or a fit or series of fits is absent a month or two when we would expect one according to the patient's previous periodicity, indicates
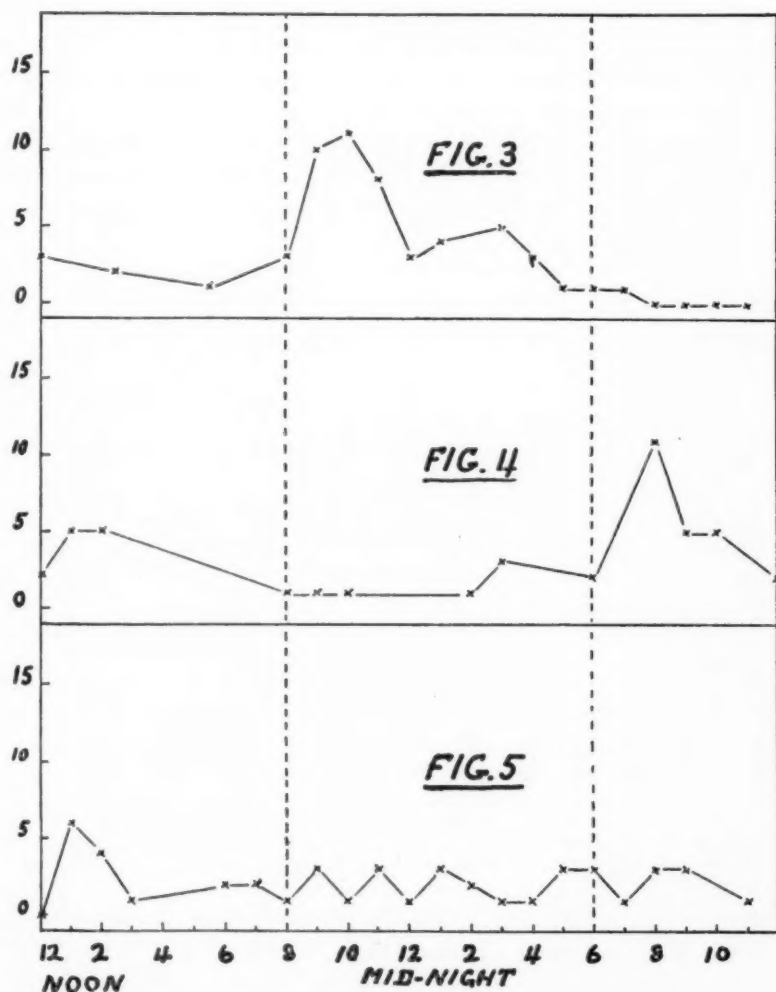
FIGS. 3-5.—Representative charts, showing the time distribution of fits in individual patients over a period of one year. Ordinates, number of fits; abscissæ, hours of the day. Dotted lines indicate hours of retirement to bed and rising.

FIG. 3.—A patient of the nocturnal group, exhibiting the peak N2.
FIG. 4.—A patient of the diurnal group, exhibiting the peak D2.
FIG. 5.—A patient of the diffused group.

52

possible modifiable or preventable factors at work. Fig. 6 which consists of the pooled fits of all the groups, shows a definite uniform trimonthly rhythm as well as a greater seasonal incidence for the early spring months.* Fig. 7, also a general pooled graph, shows a rhythm which is not so regular but nevertheless quite definite. The occurrence of a greater incidence on certain days of the month might be causally related to one or more external influ-

Fig. 6.—Graph showing time distribution of the pooled fits of all the patients in the three groups over a period of one year. The ordinates are percentages of the total number of fits. The abscissæ are months of the year.

ences, e. g., certain articles of diet, excitement in the form of an entertainment, change of temperature, humidity,* etc. Such charts might indicate the value of certain preventive measures in removing modifiable causal factors at months or seasons of the year or certain days of the month. Fig. 8 is representative of a periodicity graph

* The greater incidence of seizures at this season of the year might be partially precipitated by hyperventilation and consequent reduction of CO_2 tension of the alveolar air and thus a disturbance of the acid-base equilibrium in the direction of alkalosis. In the spring we also find a predominance of the parasympathetic nervous system [20] whose influence on sleep and convulsions should be considered in this connection.

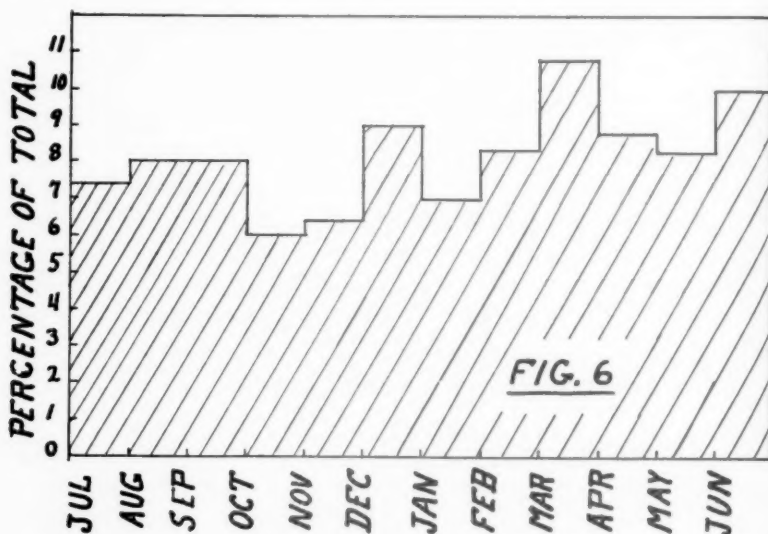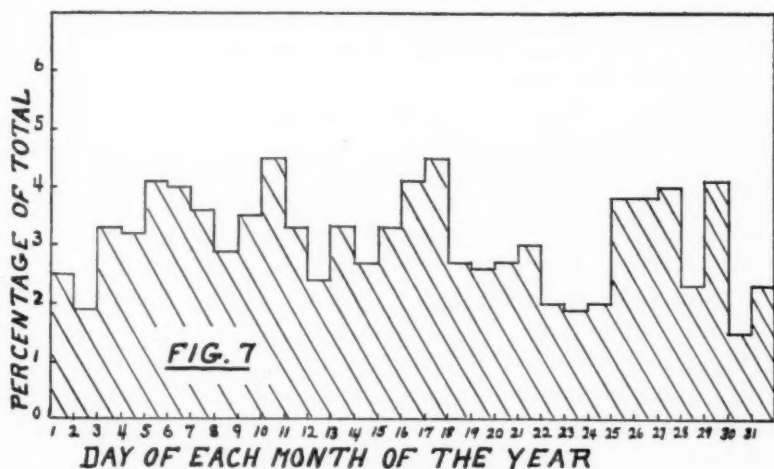FIG. 7.—Chart showing the time distribution of the pooled fits of all the patients of the three groups over a period of one year. The ordinates are percentages of the total number of fits. The abscissæ are days of each month for each month of the year.
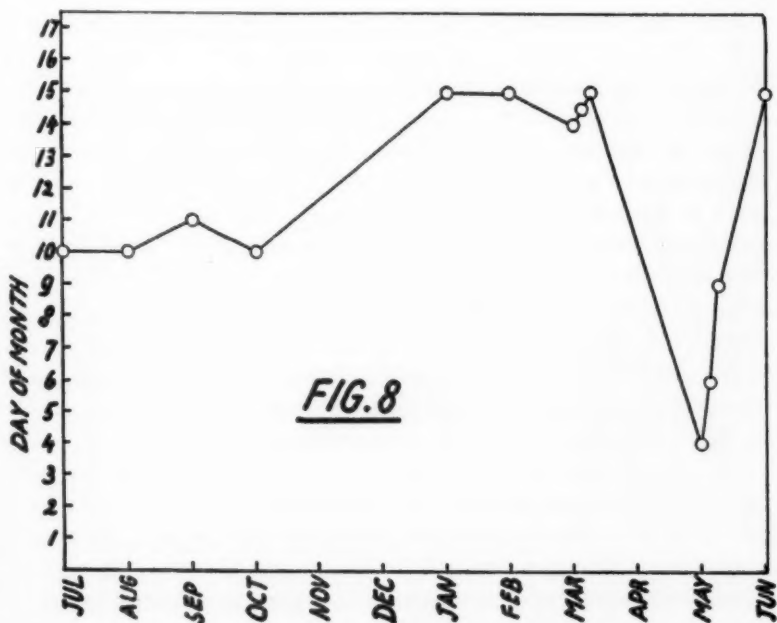

FIG. 8.—Graph showing periodicity of fits in a patient of the diffused group. The ordinates are days of the month. The abscissæ are months of the year.

of a patient of the diffused group. Note the tendencies of fits to occur about the same day each month of the year.

RELATION OF SLEEP TO SEIZURES.

It has been observed that the time of day in which fits occur is intimately associated with the phenomenon of sleep. About three-fifths of all epileptic fits occur during this state. A study of the physiology of sleep might throw some light on the problem of seizures. Such an investigation would also lead one to study other sleep disturbances such as enuresis, night terrors, anxiety attacks, somnambulism and myoclonic jerks which, to a large extent, are emotionally determined on a neuropathic substratum. The large percentage of deaths occurring during sleep might also perhaps show an interesting causal relationship to nocturnal epilepsy.

The investigations of Hess[9] show that sleep is not a negative condition but depends on positive stimulation. It is thought by him to be due to a predominance of the parasympathetic system.

One of the chief characteristics of sleep is its cyclic nature,[10] which suggests a common causal mechanism as a partial basis for the cyclic nature of fits. This state of periodicity is seen in purer form in animals such as the rat, and in still simpler form in the periodic contraction of the gastro-intestinal tract in sleep as well as in the waking state. Studies with certain animals have shown that the sleep cycle or peaks of activity depend on several factors such as internal or glandular changes, e. g., ovulation, but also on outside influence such as light, sound, temperature, moisture, etc. We also observe short rhythms (associated with ovulation) and long rhythms (associated with adrenalin, pituitary and thyroid activity) varying in length in different animals and with the sex and other factors. Even plants[11] show these fundamental sleep rhythmic changes, which are also affected by the electro-conductivity of the air.

Space does not permit a lengthy discussion of various postures in different animals during sleep and the many activities of a preparatory nature before going to sleep and during sleep as seen in animals and birds, such as nest-building which is thought to have a social significance. Various activities such as growling, barking and wagging the tail seen in dogs, or grinding the teeth and kick-

ing observed in horses are interesting types of involuntary behavior, which may be considered qualitative variants of nocturnal fits. Perhaps variation in the amount of proprioceptive sensations, such as the diminution in lying down and increase on standing, plays an etiological rôle in the timing of fits. In man, too, voluntary movements disappear in sleep and we observe spontaneous movements of various qualitative degrees such as sighing, talking, spasms, athetoid movements, tics, rhythmical movements and epileptic fits.

Changes in temperature[12] and various electrical phenomena[13] during sleep also likely play a contributing rôle in precipitating seizures. Some hibernating animals show very little change in bodily temperature whereas others do. In man the lowest body temperature is found between 3.00 and 6.00 a. m. and the highest between 3.00 and 5.00 p. m. The lower temperature is likely consequent upon the dilatation of the peripheral blood vessels with no increase in temperature because of the decreased irritability of the body temperature regulating center. This state of bodily functioning might be a cause for awakening during the early morning hours and thus cause an increase in the frequency of fits at this time.

Since sleep is an active reaction of the functioning of the total body with the submergence of the psychobiological level as the leading one, to the relative prominence of the motor (with its relaxation in tone) and vegetative levels, a cause of sleep on the basis of a reflex loss of muscle tone is suggested. The frequency of sleep following a " knock-out blow " supports this theory. In such a case sensations are reflexed from the area of trauma to the neighborhood of the lower part of the third ventricle where the sleep regulating center has been experimentally located.[14] But relaxation of muscle tone is not a necessary characteristic of sleep. As is well known many people fall asleep while on the job, *e. g.*, cab drivers, also some animals sleep in the upright and others in the hanging posture.

During sleep one also notes a decrease of blood pressure, consequent to diminished activity, decreased strength of systole and dilatation of the peripheral tree with blood stasis in these parts. The pulse is slower, diastole is lengthened, there is more blood in the brain although its velocity is decreased and the oxygen supply is diminished.

Changes in the external secretions such as dryness of the eyes and nasal secretion, increased activity of the sweat glands occur during sleep. Kidney secretion is diminished.

Respiration becomes slower and deeper and may become Cheyne-Stokes in character. At times the balance of the oxygen charge of the blood is so poor that the body makes an effort to stimulate the respiratory center. In so doing, the person is likely to wake up. This may be a precipitating cause of anxiety states and dreams as well as epileptoid phenomena. Although the alveolar CO_2[12] in sleep is increased, yet breathing is slower because of the decrease in irritability of the respiratory center. The alveolar CO_2 is highest about 3.00 a. m. and lowest at 6.00 a. m. These times, especially the latter, correspond with an increase in frequency of fits in many of the patients, and suggest further correlations between the period of transition of falling to sleep and waking and the increased incidence of seizures at this time.

The possibility of transition of one type of fit such as diurnal, to another type is given experimental support by Pembrey who was able to invert diurnal rhythms of monkeys into nocturnal types within one month by the use of dark chambers.

Just as we have different types of patients as to their time peaks, so we observe different types of sleepers—those whose curve of depth of sleep is deepest within an hour after falling to sleep and those showing a morning type with the deepest curve occurring just before waking. It is reasonable to correlate such characteristics of sleep with the occurrence of the epileptic time peaks.

Sleep should not be considered as a uniform process, but an active function with part steps and phases of varying profundity. Different parts of the body go to sleep at different times, i. e., a normal physiological dissociation occurs with the essential physiological reversibility. Irregularity in sequence and quality of the dissociation with its variation of muscle tone and many other biochemical, metabolic and physiological processes, might bear a causal relationship to the several involuntary types of behavior observed during sleep.

The relation of seizures and sleep to autointoxication has often been noted. Diabetics often fall asleep after meals, the increased rise of the blood sugar curve paralleling an increased tendency to sleep. Closely allied to this is the tendency to fall asleep upon

the accumulation of toxins consequent upon conditions of fatigue. Sleep in such a light appears to act as a protective mechanism.

External stimuli of various kinds affect the character of sleep. Usually people sleep longer when days are shorter, when lights are out, when the temperature is not too hot or cold, when the humidity is normal, when the bedding is comfortable, when ventilation is good and noise is at a minimum.

Sleep's dependence on the psychobiological level is seen in its relation to total cortical inhibition. Pavlov [15] describes it as a conditioned reflex and was unable to produce it in decorticized dogs. Sleep can be brought about by either concentrating on going to sleep—an act of the will, or by pushing away or switching off disturbing images.

Here the writer wishes to emphasize the desirability of not studying sleep only on the psychological or biological levels as a detached function of the body. We deal with an integrated personality and study the person as a whole, realizing that there are a great many part-functions which are integrated and only in their interrelationships can their causal or modifying rôle be properly evaluated. It is true we want to study part functions on various levels to the fullest extent, yet we do not wish to overlook their non-detachability in the living patient whom we treat as a total personality, and that, whether sleeping or being awake or in a period of transition, these various part-functionings are but part of a continuous stream of activity of the individual.

So in studying and treating fits we must take all the above factors into consideration and not forget their totality by focusing too much on any one influential factor. Indeed experience has shown that the study and treatment of the patient as a total personality who has to be adapted to his milieu in the best hygienic way with carefully planned attention to food, drink, exercise, rest, play, fresh air and habits of life—avoiding excessive emotional stimuli and gastro-intestinal disturbances,[16] especially constipation—is our best method and the one most widely applicable. Attention to these matters is also our best means of prevention. The removal of foci of infection and other abnormalities should be done as a matter of routine.

Finally one might mention the effect on sleep of various endocrine[9] disturbances, such as pituitary, thyroid, adrenal, etc. Obesity is frequently associated with hypersomnia. Destruction of cells

(von Economo) [13] and the interruption of various afferent path-
ways have been said to cause sleep. The study of sleep in rela-
tion to cortical and subcortical sleep centers, and the action of
various hypnotics on these areas, particularly about the third ven-
tricle, forms an interesting chapter. Also the study of various types
of narcolepsy [17] some of which may present convulsive seizures, and
their peculiar relation to emotional stimuli, may further elucidate
the problem of fits. Much work has been done on blood chemistry [18]
as well as on other biochemical and physiological problems in epi-
leptics. Such findings as alkalosis, anoxemia, excessive hydration, [19]
decreased cholesterol [20] and basal metabolism [21] may help to clear up
many of the obscure relations between fits and sleep. Further
studies concerning these conditions will not be elaborated at this
time.

Although some of the facts above stated regarding sleep have
not been fully discussed or correlated with fits, yet it is thought
that their recording would help to illuminate the whole problem.
The large number of interrelated factors [22, 23, 25] give some idea of
the complexity and immensity but not, it is hoped, insurmountability
of the subject.

Epilepsy Associated with Gross Organic Lesions.

Of the patients presenting organic syndromes, three were diag-
nosed cerebral arteriosclerosis and one brain tumor. The arterio-
sclerotics all belonged to the diffuse group, there being no peaks
observable. The brain tumor case showed only a small D3 peak.
Although no conclusions could be drawn from so few cases, yet
their convulsive features do not seem to differ essentially from
several of the idiopathic group. There would appear therefore
common constitutional factors (inherited in about 30 per cent) in
many patients showing convulsive states, both in organic and not
demonstrably organic cases. Gordon Holmes [24] believes the essen-
tial factor is the same in all, viz., a liability of the grey matter of
the brain to discharge or react by an epileptic seizure under the
influence of physiological or pathological factors.

Influence of Drugs on Time Peaks.

The influence of sodium bromide and luminal did not alter the
characteristics of the various time peaks, although the total number
of fits was reduced by their selective exhibition.

GENERAL CONCLUSIONS.

Approximately two-thirds of a group of 31 epileptics manifested
a marked difference in the diurnal and the nocturnal incidence of
their convulsions, and approximately two-thirds exhibited one or
more " time peaks," *i. e.*, a concentration of attacks at or around
certain hours. Nine such peaks have been recognized, four diurnal,
three nocturnal, and two diffused. The third nocturnal peak (maxi-
mum 3.00 to 4.00 a. m.) is the most frequent and was found in 100
per cent of the nocturnal group and in 20 per cent of all the
patients. Each of the peaks N1 and N2 occurred in 50 per cent
of the nocturnal group and in 10 per cent of the total number of
patients. Each of the peaks N2 and N3, and the peaks N1 and
N3 occurred in one-third of the nocturnal group. The peak, N3,
alone and those showing the combined three peaks N1, N2 and N3
occurred in 16.6 per cent respectively of the nocturnal group. The
principal diurnal peak, D1, whose maximum was from 6.00 to 7.00
a. m., occurred in 43 per cent of the diurnal group or 20 per cent
of the total number of patients. The principal diffused peak, M1
(maximum 9.00 to 10.00 p. m.), occurred only in 20 per cent of
this group.

Reference to Fig. 1 reveals certain contrasts between patients
of the nocturnal and the diurnal groups. Their response to day and
night is diametrically opposite and this antithesis extends to various
details in their respective graphs such as the hours 4.00 to 7.00
a. m., the period just preceding and including the awakening
and arising. During this period the incidence of fits of the noc-
turnal group falls from the most frequent peak, N3, to one of the
lowest levels. In the diurnal group it rises from one of the lower
points to the highest. The cause for this difference in reaction of
the two groups perhaps depends on many factors, some of which
have been enumerated and partially discussed above.

The contrast between the diurnal and nocturnal groups is also
demonstrated by comparing the response of the nocturnal group
to bed-time and sleep with that of the diurnal group to awakening
and arising. The former is expressed by the black area in Fig. 1
between the hours 7.00 p. m. and 12.00 midnight; the latter, by
the areas of cross-hatching in the figure between the hours of 4.00
and 7.00 a. m. The resemblance between the two curves suggests

that a similar pathophysiological effect is produced in the one group by the retirement to bed and the onset of sleep, and in the other group by awakening and getting up.

The above observations indicate that a major rôle is played by the transition from waking to sleep and vice versa, by the consequent postural and circulatory changes, as well as various other endogenous factors—physiological, biochemical, endocrinological, and metabolic, also psychogenic factors and exogenous influences which affect the time of day incidence of fits. The understanding of the pathophysiology of fits seems to be intimately connected with the phenomenon of sleep which is discussed at some length. The multiplicity of factors involved should remind us that there is no exclusive salvation by focusing on any one level or part-function, but the best results are to be obtained by the study of the total integrated personality whose fits are but one expression of a continuous and lifelong stream of activity both day and night, awake or asleep. Furthermore, the study of several items investigated and revealed in this series indicates that the best therapeutic approach, palliative, curative or preventive, lies in the regulation of the personal and social hygiene of the person with careful daily attention to food, drink, exercise, rest, play, fresh air, congenial and regular occupation, continent habits and the avoidance of excessive emotional stimuli and gastro-intestinal disturbances. Hypnotics play a secondary rôle and are most effectively used, not as a chief measure, but merely accessory to the general treatment above outlined, and then only in selected cases.

SUMMARY.

1. The causal relationship of time of day, sleep and other factors to the frequency of major convulsive states has been studied in 31 epileptics over a period of one year.

2. It is found that they fall into three groups—namely, those in whom the attacks are predominantly diurnal, mainly nocturnal, or occur indifferently by day or night.

3. Attacks are more frequent in the nocturnal and diurnal groups than in the diffused group.

4. Approximately two-thirds of 31 epileptics manifested a marked difference in the diurnal and the nocturnal incidence of

their convulsions, and approximately two-thirds exhibited one or more " time peaks," *i. e.*, a concentration of attacks at or around certain hours.

5. Nine such time peaks can be recognized, four diurnal, three nocturnal and two diffused. Their interpretation is discussed.

6. Patients of the " diurnal " and " nocturnal " groups are found to respond in an opposite manner to the onset and cessation of sleep.

7. There appears to be a basic distinction between the patients composing the respective groups. The distinction seems to depend on many factors—endogenous and exogenous—important among them being the type of sleep and associated conditions, transition from waking to sleep and vice versa and consequent postural and circulatory changes, alveolar CO_2 tension and temperature variations.

8. Many patients show a fairly definite regular periodicity of fits, not only with respect to day, but also the day of the month, and the month of the year and season. Absence of the expected occurrence of fits, or irregularities should lead us to seek causes for the change and might result in a decrease of the number of fits through ascertaining modifiable or preventable factors at work. These factors are often situational or dietetic.

9. The pooled fits of all the patients of the three groups show a greater seasonal incidence during the spring months. This might be partially due to hyperventilation and hyperparasympatheticotonia.

10. Four patients suffered from organic lesions of the nervous system. Most of these belonged to the diffused group, but in other respects the type of their seizures differed in no essential from the 27 cases of " idiopathic " epilepsy.

11. A larger percentage of the diffused group craved salt, milk or meat than of the other two groups. On the other hand various forms of excitement precipitated more fits in the diurnal and nocturnal types. In the latter group there was a higher percentage of mental instability than in the diffused and diurnal groups.

12. There is little difference in the mental age of the three groups, although mental deterioration seems to be less rapid in the diurnal type, a fact which might be related to a lesser degree of mental instability in this group.

13. Asthenic and dysplastic physical constitutional types predominate in the diurnal and diffused groups, whereas the pyknic type was more frequent in the nocturnal group.

14. A high systolic blood pressure and particularly a high pulse pressure were found to be poor prognostic signs.

15. Individuals in the diffused group are more likely to have a longer psychotic period than those in the other two groups, notwithstanding the older average age of the onset of the convulsive state in the individuals of the former group. The latter group is more likely to include the non-idiopathic types.

16. Patients showing isolated single fits are more numerous in the nocturnal and diffused group. The nocturnal type seem more prone to status epilepticus.

17. The diurnal group shows the longest interval between attacks, and the diffused group, the shortest. This might account for the relatively minimal deterioration level in the diurnal group.

18. There is a tendency for the number of fits as well as the time duration of the auræ to diminish with the increased duration of the disease.

19. The average duration of the post-convulsive stupor and confusion is somewhat longer in the diurnal group.

20. The regular occurrence of nocturnal fits and to a somewhat less degree diurnal fits is usually a poor prognostic sign.

21. The generally held view that the younger the individual at the time of onset of the convulsive state, the longer the duration of the period of fits, would seem to be confirmed by our findings.

22. A few remarks concerning the nature of the epileptic disorder and its treatment are discussed.

BIBLIOGRAPHY.

1. Langdon-Down, M., and Brain, W. R.: Time of Day in Relation to Convulsions in Epilepsy. Lancet 1 : 1029-1032, May 18, 1929.
2. Gowers, W. R.: Epilepsy and Other Convulsive Diseases. 2d Edition. Philadelphia, Blakiston, 1901.
3. Delbrück H.: Epileptisch und Epileptoid—Gedanken zum Körperbau—und Charakterproblem. Arch. f. Psychiat., 2; 708, 1928.
4. Lichtenstein, E.: Ein Beitrag zur Frage der Beziehungen zwischen Blutdruck und epileptischem Anfall. München. Med. Wchnschr., 75 : 471-472, March 16, 1928.
5. Schon, H. I., and Susman, W.: The Endocrines in Epilepsy. Brain, 50 : 53, March, 1927.

6. Bethea, W. R.: Gastro-Intestinal Study of Four Hundred Epileptics. South. Med. J., 20: 430-436, June, 1927.

7. Diethelm, O.: The Bromide Treatment for Epilepsy in the Dispensary. Arch. Neurol. and Psychiat., 21: 664-676, March, 1929.

8. Meyer, M.: Der epileptische Krampfall und seine Beziehungen zu atmosphärischen Einflüssen. Der Nervenarzt, I: 592-600, October 15, 1928.

9. Hess, W. R.: Über die Wechselbeziehungen zwischen psychischen und vegetativen Funktionen. Zurich, O. Fussli, 1925, page 15.

10. Hoffman, R. D.: Periodischer Tageswechsel und andere biologische Rhythmen bei den poikilothermen Tieren. Handbuch der Normalen und Pathologischen Physiologie, XVII, Cor. III, Berlin, 644-658, 1926.

11. Stroppel, R.: Tagesperiodische Erscheinungen bei Pflanzen. Ibid., 659-668.

12. Ebbecke, U.: Physiologie des Schlafes. Ibid., 563-590.

13. Economo, C. V.: Die Pathologie des Schlafes. Ibid., 591-610.

14. Landis, C.: Electrical Phenomena of the Body During Sleep. Am. J. Physiol. 81: 6-19, June, 1927.

15. Pavlov, I. P.: Lectures on Conditioned Reflexes. New York. Internat. Pub. 305-318, 1928.

16. Davis, T. K.: Basal Metabolism and Gastro-Intestinal Findings in Epileptic Patients; With a Note on Treatment. J. Nerv. & Ment. Dis. 70: 264, September, 1929.

17. Richter, C. P.: Pathologic Sleep and Similar Conditions. Arch. Neurol. and Psychiat. 21: 363-375, February, 1929.

18. Osnato, M., Killian, J. A., Garcia, T., and Mattice, M. R.: Comparative Chemical Studies of the Blood and Spinal Fluid in Epilepsy. Brain. 50: 581-600, October, 1927.

19. Fay, T.: Some factors in the "Mechanical Theory of Epilepsy," With Especial Reference to the Influence of Fluid, and its Control in the Treatment of Certain Cases. Amer. J. Psychiat. 8: 783, March, 1929.

20. Goodall, E.: Blood-Cholesterol During the Menstrual and Epileptic Cycles. Lancet. I: 384, Feb. 23, 1929.

21. Lennox, W. G., and Wright, L. H.: Studies in Epilepsy—The Basal Metabolism. Arch. Neurol. and Psychiat. 20: 764, October, 1928.

22. Brain, W. R., Turner, A., Sutherland, G. A., Riddoch, G., Wilson, S. A. K., and Stewart, T. G.: Proc. Roy. Soc. Med. 20: 855-866, 1927.

23. Brock, S.: Problem of Epilepsies. Internat. Clin. 4: 178-192, December, 1928.

24. Holmes, G.: Section of Neurology and Psychological Medicine of the Br. Med. Assoc. July, 1929. Brit. Med. J. No. 3579, 260, August 10, 1929.

25. Lennox, W. G., and Cobb, S.: Epilepsy. Harvard Med. Monog., Vol. XIV, Baltimore, Williams & Wilkins, 1928.

26. Ratner, J.: Über Saisonepilepsie. Ztschr. f. d. ges. Neurol. u. Psychiat. 108: 446-457, 1927.

THE TREATMENT OF POST-ENCEPHALITIC CHILDREN IN A HOSPITAL SCHOOL.*

By EARL D. BOND, M. D., AND KENNETH E. APPEL, M. D.,
Pennsylvania Hospital, Institute for Mental Hygiene, Philadelphia.

During the World War Von Economo described the disease known as encephalitis lethargica. Since then a number of allied conditions have been emphasized in the literature, amongst others post-vaccinal encephalitis, and the cerebral involvement that sometimes accompanies the acute infections of childhood. Following the acute illness of encephalitis, whether continuing as residuals or appearing as new manifestations, two types of disturbances frequently have been observed, namely, neurological signs (*e. g.,* Parkinsonian changes and tics) and character changes. It is with the latter disturbances, unfortunately found almost always in children, that this report is concerned.

Characteristic changes have been reported all over the world to have followed, rather frequently, encephalitis in children. Instability, irritability, and a tendency to extraordinary emotional explosions seeming to brook no inhibitions have characterized the behavior of these children. They have found social adjustment difficult, have not been able to learn from experience, and ordinary methods of control and punishment have been ineffective.

A characteristic history follows. Blanche was normal until the age of eight when suddenly encephalitis attacked her with crossing of the eyes, double vision, and sleepiness. Conduct disorders appeared: tantrums, jealousy, overactivity, overaffectionateness, obscenities, and sexual misdemeanors. On admission to the hospital she was wild, stole, broke things, upset dishes and trays, and lied about everything. She fought and kicked, laughed when she caused an older person to fall, and kicked a maid viciously. Following this she got in a tub and "assumed an expression of angelic innocence."

Chart I shows the frequency of behavior disorders in eight girl patients admitted to our hospital.

CHART I.

BEHAVIOR DIFFICULTIES IN EIGHT (8) GIRLS.

Behavior difficulty	No. of children	Behavior difficulty	No. of children
Quarrelling	7	Teasing	2
Refusal to co-operate, temper tantrums, crying	5	Lying	5
		Fabrications	2
Lack of inhibition—disregard of commonly accepted considerations	8	Marked Projection	3
		Swearing	4
		Masturbation	5
Stealing	3	Undesirable sex habits....	5
Running away	1	Restlessness or Hyperkinesis....	3
Thumb-sucking	1	Exhibitionism	1
Enuresis	3	Slovenliness	4
Soiling—Smearing	2	Cruelty	3
Destructiveness	1	Biting	3
Setting Fire	1	Hypokinesis	3
Disobedience—Stubbornness	4	Sleepiness	2
Tic	1	Spitting	2
Overaffectionateness	4		

Fifty-seven (57) children with post-encephalitic behavior disorders have been admitted to the Pennsylvania Hospital, but only 9 of these cases came before the school was started. In addition there have been 14 other children who, although not having had encephalitis, presented conduct disorders of a similar kind. They have been thought of as controls or cases to be borne in mind for comparisons. The history of one such girl follows:

E. was of a dysplastic body type. There was fixation nystagmus associated with retinitis pigmentosa. She had poor control of the muscles of her hands and legs. Her mother was promiscuous and the father a " degenerate." For her first four years of life she was neglectfully cared for by relations. Then followed two placements in foster homes. She talked incessantly, was restless at night and masturbated. She frequently ran in front of automobiles. She flew into temper tantrums. At eight she killed the gold fish in her foster home, cut up candle shades, and scattered water, flour, and corn flakes on the parlor floor. She was revengeful and stubborn but craved affection.

There was thus a group in the community causing difficulties of serious social consequence, following an attack of a serious and often unsuspected disease, encephalitis lethargica. The ordinary

home, foster homes, boarding schools, pediatric hospitals, reform schools and penal institutions, were not prepared to deal with these conditions. Association with adult patients in the mental hospital was unsatisfactory and often detrimental to both. It was this situation that led to the establishment of the hospital school about five years ago.*

The physical environment consisted of adequate living quarters (dormitories, living rooms, dining rooms, occupational shops, a gymnasium, and swimming pools), connected with the separate men's and women's departments, of the Pennsylvania Hospital for Mental and Nervous Diseases. There were generous recreational facilities on the grounds of the separate departments and in the summer the boys and girls went in turn to a camp on the hospital farm. A school room was used in the morning by the boys and in the afternoon by the girls. With the development of the new institute for mental hygiene the boys and girls will be brought together for class-room and recreational activities in their new school building.

The personnel consisted of a graduate nurse, who had psychiatric training, in charge. There were both graduate and student relief nurses; and attendants occasionally were used. Male nurses were with the boys and female nurses were with the girls. A school teacher, trained in special class work, taught the children. Part of the time the children were not in school was given over to occupational teachers—one for each group. A music teacher had regular periods through the week when she held a singing class. There was regular time allotted to gymnastic work and swimming. A psychologist made tests from time to time. Several psychiatrists who had special interests in children supervised and co-ordinated the work as part of their regular hospital routine. No psychiatrist devoted full time to the children.

The psychiatric nurse, trained to look upon unusual, irritating, and anti-social behavior with equanimity and understanding, was a great help. The children thus found an unemotional background to their behavior in the hospital, which was in marked contrast to what they had experienced before hospital entry. In this connec-

* Bond, E. D., and Partridge, G. E.: Post-Encephalitic Behavior Disorders in Boys and Their Management in a Hospital. Am. J. Psych., Vol. VI, 25-103, July, 1926.

53

tion it was found that difficulties arose most frequently when sub-
stitute nurses or attendants were on duty. They were imposed
upon, and it was most helpful therefore to arrange that the same
substitutes be used as regularly as possible. It was fortunate that
we were able to obtain the co-operation of nurses who were willing
to work in somewhat variable and irregular schedules instead of
sticking rigidly to recognized nurses' hours. For example, it re-
lieved much tension if the nurse who had the children through
the afternoon and for supper stayed on duty until the children
were asleep, instead of introducing a new nurse at 7 p. m., just
before the children retired. The arrangement was that one nurse
came on in the morning and stayed until the middle of the after-
noon, while the other came on in the afternoon and stayed until
the children were asleep, when a night nurse took care of the
children. When the nurses took meals with the children much dis-
turbance at this time was automatically eliminated. And finally,
a foster parent experiment convinced us that it was a distinct ad-
vantage to have a foster mother living rather intimately with the
children. This will be incorporated in our new school.

Graded school work was carried on, but emphasis naturally had
to be placed on individual difficulties and problems. The amount
of work done was probably equal to a half or two-thirds of that
done in the ordinary grade schools. The group lacked initiative and
originality notwithstanding their restlessness and curiosity. Ap-
proaches were frequently sugar-coated in games. Restlessness was
met by being kept busy every minute—extra material, and extra
books were kept on hand. The recitation periods were short. In-
dividual differences were taken into account in the work required
of each child.

The hospital point of view and the long distance plan which was
continually emphasized formed a helpful background for patients
and nurses alike. All workers coming in contact with the children
were urged to read: Thom's " Every-day Problems of the Every-
day Child," Cameron's " The Nervous Child," Sayles' " The Prob-
lem Child at Home," and Wickes' " The Inner World of Child-
hood." Every effort was made to manifest a spirit of *optimism*.
The children were encouraged to feel that their behavior difficulties
could be " cured " like any other condition for which one goes to
a hospital. The *unemotional attitude* toward delinquencies was

maintained. The *impersonal authority* of the hospital often contrasted markedly to the divided and emotional attitudes of the home. Finally *understanding and co-operation* were *stressed rather than criticism, discipline, and punishment.* Nearly all the children had rationalized their bad behavior and had the ready excuse that they couldn't help what they did because they were sick, nervous, or had sleeping sickness. Thus here was a problem in mental hygiene right at the start.

The routine of the day while not absolutely rigid followed certain regular lines as seen in the following schedules. Adopting a fairly regular routine eliminates much mischief through substitutive activity. There is often a tendency on the part of inexperienced helpers to oversupervise. A certain amount of free play time is very necessary. Even then, however, it has been our experience, things work out better if a supervisor is in the distance for emergencies.

THE SCHEDULES.

A. M.	Boys	Girls
6.30	Dress	Dress
7.00	Breakfast	Breakfast
7.30	Housework	Clear dishes—set table
8.00	Ready for school ⎱	Play out-of-doors on own
8.50	Walk and run out-of-doors ⎰	initiative
9.00	School	
10.30		Occupational therapy or hydrotherapy
		Rest in bed
11.30	Wash up	
11.45		Wash up
12.00	Dinner	Dinner
12.30	Dress for play	Prepare for school
P. M.		
1.00	Play on grounds or in gymnasium ⎱	School
2.00	Occupational therapy ⎰	
3.30	Gymnastics, group work	Music
4.00	Natatorium	Out-door play
4.30	Wash-up, house in order	Fix bed, prepare supper
5.00	Supper	Supper
5.30	Individual play indoors	Room work
6.00	games puzzles, toys, story telling, books	Baths
7.00		Play, nourishment
7.45		
8.00	Bed	Bed

However, mere impersonal schedules and gross group methods were not enough. Individualization and consideration of the separate personalities must be added, to obtain the best results. In contrast to child guidance clinics where emphasis is being laid on work with parents, our influence has been brought to bear for a number of reasons, characteristically on the child itself.

In order to bring home to those in charge of the children that behavior disorders are the manifestations of difficulties in the dynamics of personality adjustments, conferences were held at varying intervals. Teachers, nurses, psychologists, and psychiatrists attended these conferences. Here observations, impressions, and suggestions were pooled. This was very important, else a teacher and nurse might approach a problem with conflicting attitudes. Previous to the conference the individual workers had made out a report on the personality traits of the child according to a modified scheme from Blanton.*

This scheme was supplemented by concrete accounts of difficulties and successes both in work and behavior, at school, in the occupational training classes, at household activities, and at play. Notes on physical health (weight, eating, sleeping) were read, and also on various bodily habits ; *e. g.,* masturbation. Notes were made concretely on work and behavior that was satisfactory, poor, or showing progress. We tried to find what enthusiasms the child had. A final discussion of the most outstanding traits or greatest problems, and the best approach to the problem, concluded the conference. Several hours were given to a conference. There are objections to such a formal procedure but it gave a *modus operandi* to get all the *personnel thinking on the child's personality and its problems,* and *his reactions in terms of his needs.* It diverted the personnel from the more striking and irritating behavior difficulties to the deeper issues involved. It brought to them all the point that in the face of exasperating, disturbing, and destructive behavior, thinking was often more important than acting, and understanding more helpful than discipline.

While the hospital point of view, schedules and routine, helped the children as a *group,* the conferences focussed attention on the individual. The individual had to be reached and only through understanding could he be reached. This meant a great deal of

* Child Guidance, Blanton and Blanton, New York, 1929.

individual personality study chiefly on the part of the psychiatrist. This necessitated the cultivation of rapport with the individual child. The use of stories, phantasies, dreams, and drawings, were most helpful methods in establishing intimate relations with the children and obtaining a view of their inner thoughts and attitudes.*

Reading the story of Pinocchio to them, established an intimacy and fellow-feeling which was invaluable. At the same time de Schweinitz' book Growing Up was read during half our reading time. Sex was thus taken up naturally and openly as a matter of interest and information. Some of the questions raised (and answered honestly) showed an almost unbelievable degree of spontaneity and frankness. It was interesting that after reading Growing Up masturbatory practices, and much of the rather filthy talk on sex and menstruation, automatically decreased, for the most part, to insignificant proportions.

On rambles through the hospital grounds with an individual child, what more natural than to talk about Pinocchio or the stories the child liked. And it was a natural step to ask the child to tell us a story or make one up. The following two stories indicated serious problems in the psychology of our little girls:

A mother had a little girl and a man came along and took her for a ride. He then told her to shut up. She didn't. He put his hands over her mouth and cut her up.

In the second story a mother sold her child to a witch for a dollar. Then by some sort of ruse (which was not clear, and it is not wise to insist on clarity) the "child cut off the witch's head."

It is difficult to get away from the impression that the hand over the mouth stood for forced repression (perhaps by our methods at the hospital, perhaps also at home), that the cutting up represented punishment (the cruel methods that had been used to influence her conduct) and that her final treatment of the witch represented her unexpressed attitude toward us. Whatever the significance of the story, at the time she told us this, we were not earning her good will, and probably if adults seem like witches to children it is not possible to win them.

* More complete accounts of these methods will be found in the following publications which will be printed in the future: "The Hospital Treatment of Post-Encephalitic Children," Earl D. Bond, M. D., and Kenneth E. Appel, M. D. "Drawings by Children as Aids to Personality Studies," Kenneth E. Appel, M. D.

Telling stories is an easy approach to dreams. We told them dreams were the stories one makes up in one's sleep. The dreams were most interesting and often had much significance for the life of the individual child. There are of course close relations between phantasy and the dream life—a distinction is not very important for they both represent subconscious, that is, uncontrolled, thinking.

Occasionally children would write or join in writing games when they were evasive and protective in their verbal replies. Blottoes and ink dabs were used in a way similar to the Rohrschack test.* The blottoes and drawings were introduced by telling the child that she was going to do something that was a sort of game and that it would be fun.

A piece of paper was then given the child and she was asked to draw a picture of her home, the house in which she lived. Crayons or pencils were available for her choice. Comments on the physical aspect of the home were recorded sketchily by the side of the drawing. The child was then asked to indicate where the different persons slept that lived at home. Then a drawing was made of each member of the family doing something. By a set of judicious questions and spontaneous comments on the drawings, a rather complete and vivid picture was obtained of the various persons in the home, the child's reactions to family and social relationships, and also her attitudes toward birth, death, health, sickness, and discipline. The whole procedure was done most impersonally and comments were recorded with a gusto so that they served to be almost part of the child's drawings. Drawings and comments ran along very smoothly, after the sequence of suggestions for drawings and questions was developed. Parental substitutes, whether relatives or teachers, came after the family. Then drawings of playmates and friends. Criticism, dissatisfaction, identification, rejection, and protection unfolded plentifully under such a procedure. Phantasies and fundamental trends stood out in response to the dramatized drawings of wishes, bags of money, and dreams. The use that magical power would be put to, if possessed, was significant. Fears often appeared in remarks about animals. Reversal situations (if you were the mother of a little girl, or if you were the father of a little girl, what would you do?) were most helpful
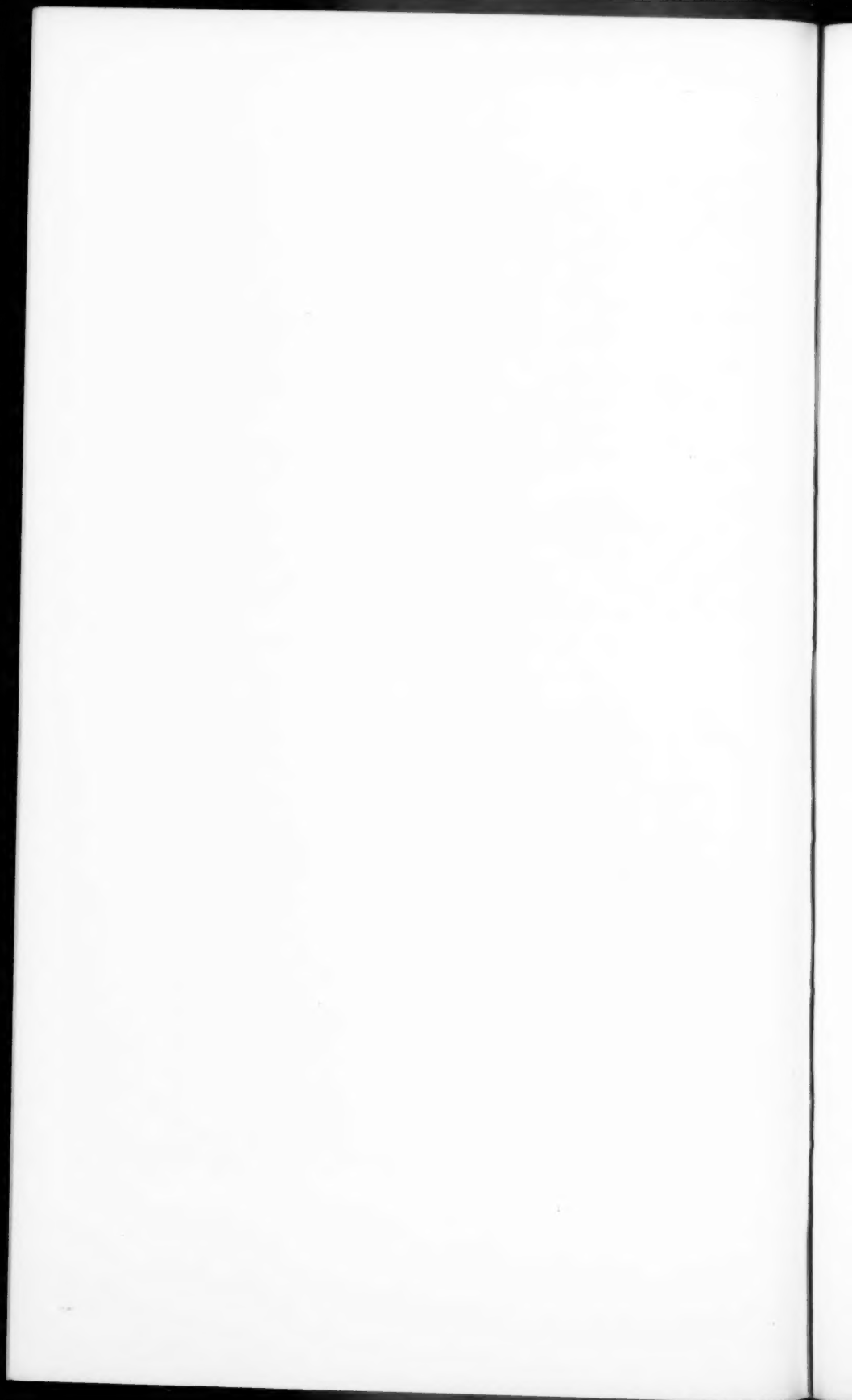
* Studies are now in progress using the Rohrschack test itself.

JANET'S DRAWING OF FOSTER MOTHER AND PLAYMATE.

ANNE'S DRAWING OF NURSE AND DOCTOR.

in revealing fundamental needs and motives. Such procedures entered into enthusiastically made a path to their own little personalities which otherwise often seemed blocked.

The figure on the left in Janet's drawing represents a foster mother of one of our children. The mother is drawn with hair down her back in an untidy fashion, eating by herself. The comments to this drawing did not reveal a hopeful relationship with the child.

Janet's comments on the right side of her drawing showed that the patient had an emotional attachment to a foster sister on a moral and almost religious basis, yet from the behavior of the child and her ordinary conversation one could not have imagined such possibilities.

On the right in Anne's drawing is the doctor. The patient remarked as she was drawing this that the doctor was dressed up to take his best girl out for a walk—herself no doubt, hoping to be the best girl. Negative feeling toward the doctor appeared when she said that if the doctor was bad and wrote bad reports she would have the dentist pull out his teeth. But if he was good, she would have the dentist replace them. Then she continued, " If you're very good I'll tell the dentist to make you climb trees. You should go on the swing tomorrow. You have to come and see-saw with us." Thus we were shown how we could return to our patient's good graces. The remark about the bad reports was interesting however, because it showed we were failing in our job—if the child received at times the impression that one of our duties was to make out bad reports.

The drawing of the nurse on the left in Anne's picture is interesting because of the symbolism employed and the use of the projection mechanism. The child drew the nurse's black hair to look like a stove pipe. She added, " Smoke is coming out of her head. She thinks she smells smoke—but she don't—It's our stove. She went to turn it off but the fire came out on her." The smelling of smoke is no doubt a symbolic representation of the bad odor the patient was in both actually and socially as a result of her enuresis. She disclaimed this by making smoke come out of the nurse's head. This interpretation is probably further substantiated by the fact that the nurse was drawn with bloomers hanging down and of course enuresis is a problem that has much to do with bloomers.

There is no time to go into individual methods of handling specific instances of extraordinary difficult behavior—this will be published elsewhere.*

The results to date of the hospital school experiment are shown concretely in Charts II and III. They are self-explanatory.

CHART II.

OUTCOME OF POST-ENCEPHALITIC CHILDREN NOT IN CLASS.

Type of case	No. of cases	Result
Behavior problem with Parkinsonian signs	3	Physical deterioration
Behavior problem with convulsions (? epilpesy)	2	Physical deterioration
Behavior problem with aphasia	1	Doubtful
Behavior problem under 12 years (no class available)	2	Mental deterioration
Behavior problem over 12 years (no class available)	1	Mental deterioration

CHART III.

LONG DISTANCE OUTCOME OF CHILDREN IN CLASS.

	Post encephalitic	Controls
Good	7	1
Doubtful	7	1
Poor	6	2
Still in classes	22	8
Feeble-minded	6	2
	48	14

These figures show that of 20 post-encephalitic cases (excluding the feeble-minded) sent home, 7 had good results or 35 per cent as compared with total failure of family placement as reported by Healy.† The feeble-minded were prepared to be carried without unusual difficulty in a school or colony for such persons. Many of the children in the school show promise and are being kept not because they are not improved but because it is hoped their chances in the community can be improved still further.

* *Op. cit.*

† Healy, Bronner, Baylor, Murphy: "Reconstructing Behavior in Youth," 1929.

In summary, of 48 post-encephalitic children and 14 non-encephalitic behavior cases, all but three have been able to learn by experience and to improve to a fairly satisfactory level *in the hospital.* Here their behavior has been acceptable in the main. *At home* 7 out of 20 have taken a second turn in their lives, and are reversing the downward direction of behavior after encephalitis. There is ground for being optimistic in the belief that our successes can be increased by some of those who remain in the hospital classes now.

The employment of the methods just sketched show that what is most important is not the symptoms of lying, stealing, disobedience, etc., but the underlying feelings of insecurity, the regressive tendencies, and the intense extra- and intraversions. In addition to the *improved psychological environment,* the *opportunities for physical repair* have been favored by regular habits of rest, occupation, exercise, and diet. The physical disease, encephalitis, caused handicaps which the children were not able to manage psychologically—the hospital school has enabled the majority of those children to win control.

DISCUSSION.

DR. HARRY J. BAKER (Detroit, Mich.).—I represent the psychological department of the Detroit public schools as a psychologist. I am also primarily concerned with this type of behavior as regards the education of children in general. I am very much impressed with the amount of diagnosis and material which is very helpful from these meetings. I wish to point out the other side of this picture, namely, how much crippled we are in school procedures in trying to adequately cope with such situations as have been presented, particularly in this last paper. You probably realize that throughout the country, there are hundreds of children in public schools that offer the types of behavior difficulties that we have had mentioned here, and we have had pictured for us and painted for us very vivid pictures of their behavior troubles, particularly in the homes. These same difficulties also arise in the class-rooms.

You may wonder why the schools do not do more about these particular problems. You probably realize from the medical and psychiatric point of view how difficult it is merely to diagnose them. We also want to hear much more about the treatment; that is the thing which the school people are asking for primarily. They wish, of course, to have diagnosis, but treatment that can be carried out is a very, very important thing.

I wish to call attention to some of the limitations which the school people probably have in trying to work out such problems as we feel are necessary.

In the first place, our teachers generally do not have the training which we would like to see in order to cope with these problems. A very small percentage of all teachers, we might say a fraction of one per cent, have any particular conception of all the problems arising in the background of behavior.

Another thing is that even though we had teachers entirely trained in public schools generally to handle such problems, we would still have the question, do we have time or facilities or the inclination to do such work? You probably know that the program of public education is so crowded with regular activities that the time and patience for individual study which is necessary is almost out of the question. We have in that connection a question raised as to whether or not we should segregate children who offer problems of this kind into special classes where we could give the medical and psychiatric services that are necessary. We find public support for such experiments, which are looked upon as more or less experiments, is very hard to get at the present time.

I might say also in conclusion that I am representing one of the White House Conferences on Child Health and Protection and am chairman of one of the sub-sections dealing with the educational adjustment of the nervous, the emotionally unstable and the delinquent. I assure you we have a large order on our hands to try to set up some recommendations that the public schools generally shall do in order to handle problems of that kind. I think it is a very fine thing that Dr. Bond and his staff in Philadelphia have taken many of these children and brought in teachers and put the educational program in very close contact with the hospital program. I think that it would be well from the standpoint of psychiatry, psychology and teaching, if we could get all these forces together, because at the present time, as in the case of the legal profession, we may be prone to sit back and think the other person should do more without telling him just what to do.

DR. WILLIAM L. NELSON (St. Louis, Mo.).—I think it is very fortunate indeed that Dr. Bond has presented to us here in such facile and clear manner the method of procedure in dealing with children that are so handicapped as the post-encephalitic. I think it is also fortunate that we have illustrated to us the fact that there has been some other approach to the problem, rather than that of dealing with the child in the home, because after all it gives us some opportunity for comparison between the treatment of the child, leaving him in the home, as compared with the treatment of a child removed to an institution.

I suppose that lack of time in presenting this paper interfered with a statement in regard to the family background of children developing encephalitic conditions. It has been our experience, as it was demonstrated in the study that Peter Bassoe made in 1922 of lethargic encephalitis, that these individuals are below par in some phase of their constitution. I don't know but that the study that was made of these children would show just what the interrelationship in the family is, the degree of emotion integrity, the stability that existed

in these individuals prior to the development of encephalitis. In our experience, we have not had a single case in which there was a thorough, stable, well-integrated, emotional status, of children developing such conditions.

Just a word in regard to the treatment of an individual in an institution as compared with treatment of the individual in the home. It has been mentioned casually that the treatment in this hospital school is a deviation or an emergence from the ordinary child guidance attitude that is taken toward these children. As a matter of fact, if you have a family background that represents a certain degree of distortion, if there is instability in the home, if there are individuals who impinge upon the life of these children, lacking in integrity themselves, lacking in understanding of life, it is necessary, if these children are to go back to their home environment, that treatment be exerted upon the home circle, upon the influences that will be brought to bear upon such children. Our treatment has been carried on in connection with the child individually and our results are quite comparable so far as improvement is concerned with the method that has been adopted in the hospital care.

I believe that even in a mental disease hospital in dealing with children, one has to select carefully the personnel that is going to deal with such children, because it requires an understanding of child life that I am frank to say does not exist in the average mental disease hospital today. So it requires the assembling of a corps of individuals that are emotionally adapted to carry on such work and that are trainable to a concept of improvement of these states.

The question comes up as to where is the logical place to install this sort of a régime or program. Nobody can find fault with its being lodged in the hospital, except that since this is an educational thing and since it is a thing that our public schools should recognize as a responsibility, because there are a number of these children in the world and they increase, or at least we have additional cases all the time, it becomes a general educational problem that boards of education should recognize. It seems to me that the logical place for the erection of such an institution would be in connection with the public school system.

DR. HENRY I. KLOPP (Allentown, Pa.).—I want to most heartily endorse the statement made by the last speaker and in a few words bring out the fact that there has been established at the Allentown State Hospital at Allentown, Pennsylvania, a Children's Institute for Mental Health which somewhat differs from the one just described, for the reason that we have, and do accept, a cosmopolitan group or type of children. I believe that much can be done and should be done by our State Hospitals for Mental Diseases in the establishment of such a department. I know that many superintendents would not care to do this, for it means additional responsibilities, trials and cares. Nevertheless, how are these problem and conduct-disorder children to be properly studied, cared for and treated unless by the psychiatrists connected with state mental hospitals and private incorporated hospitals?

I also agree with the speaker in regard to our public schools. They, however, are not far enough advanced to promote anything of this kind but are beginning to see the necessity of this. I am happy to say that in Pennsylvania the judges of our juvenile courts recognize definitely the value of the work that the Allentown State Hospital is doing in connection with its Children's Institute for Mental Health, likewise the various social agencies and the public schools.

FUNCTIONAL ACHLORHYDRIA AND THE HISTAMINE TEST.

By S. KATZENELBOGEN and W. C. M. SCOTT,

Henry Phipps Psychiatric Clinic (Department of Internal Medicine), Johns Hopkins Hospital.

The purpose of this note is to emphasize the usefulness of the histamine test in the investigation of the gastric secretion. When the routine gastric analysis reveals hypoacidity or anacidity, it is of prime importance to determine the nature of the deficient secretion. It is indeed well known that achlorhydria is to be found in various organic pathological conditions, such as cancer of the stomach, gall bladder disease, chronic gastritis, combined sclerosis of the spinal cord with or without the blood picture of pernicious anemia. The relation between combined sclerosis and achlorhydria is of particular interest, inasmuch as these two conditions are not only constantly associated, but achlorhydria may be for a more or less long period the only forerunner of Biermer's anemia. On the other hand, one is not infrequently confronted with hyposecretion or the entire lack of secretion of free hydrochloric acid in individuals in whom none of the aforementioned ailments are present. Very frequently these individuals display, on the contrary, evidences of certain psycho-neurotic conditions and the hypochlorhydria with which they are afflicted is apparently induced by an altered function of the neuro-vegetative system. It is likely that the instability of this part of the nervous system in psycho-neurotic individuals is also responsible for the fluctuations in the activity of the gastric mucous membrane ; these individuals may at one time present hypo-chlorhydria and then again at a short interval a normal secretion or even a hypersecretion of free hydrochloric acid. It is evidently not immaterial, from the prognostic standpoint, to know whether achlorhydria in a given case is of the so-called functional or organic origin. The fractional gastric analysis will certainly reveal acidity in one or another specimen of the gastric juice in many of those cases in which no free HCl would be found if only one extraction were made from 45 minutes to 1 hour after the test meal. There

still will remain cases in which the ordinary Rehfuss fractional analysis will be negative. In these cases the histamine test presents a valuable means of establishing whether the gastric mucous membrane is able to secrete free hydrochloric acid. The pharmacodynamic and pharmacologic effects of histamine have been the subject of numerous studies.[1] It suffices to mention here only that this substance is a powerful stimulant of the gastric secretion and particularly of the secretion of free hydrochloric acid. (It is, as is well known, in this property that the diagnostic value of the test we are considering lies.) We used this test only in those cases in which the usual fractional gastric analysis revealed either complete achlorhydria or a pronounced hypochlorhydria. Histamine was given in all cases in addition to the test meal and the extractions were made at the same intervals as in the preceding analysis without histamine. The Ewald's test meal was used in all cases and alcohol in one case. The valuable information which we got from these tests, to warrant this communication, will be seen from the brief summaries of the records and the detailed results of the gastric analyses tabulated in the tables.

RECORDS.

CASE I.—*Organic Delirium. Pellagra (?).*—A married woman of 52 was admitted to the clinic on 3-13-28, following restlessness, sleeplessness and weakness since 5-27. Since 11-27, she was self accusatory and also thought that people were going to do her harm. More recently, she had become at times disoriented and hallucinated. There were many gastric complaints at the age of 42. On admission the patient was slowed, drowsy, at times resistant and disoriented, preoccupied by seeing snakes and other animals in her room and tried to put them out. Marked emaciation; infiltrated pigmented patches on the arms and legs; congested throat. G. I. X-ray normal. The fractional gastric analysis showed complete alchlorhydria. Histamine induced secretion of free and combined hydrochloric acid.

---

[1] See the bibliography in:

Bockus, H. L., and Bank, Y.: The value of histamine as a test for gastric function. Arch. of Intern. Med., Vol 39, No. 4, 1927, p. 508.

Katzenelbogen, S., et Choisy, R.: L'influence de l'histamine sur la secretion gastrique, particulièrement sur l'acide chlorhydrique libre (dosage electrometrique). Arch. Mal. App. Digestif., T. 17, No. 3, March 1927.

Katzenelbogen, S., et Choisy, R.: Etude de la secretion gastrique par l'épreuve de l'histamine. Schw. Med. Woch. 1927, No. 42, p. 1009.

CASE 2.—*Depression.*—A single woman of 34 presents on admission a worried anxious expression; apprehensive and self accusatory; preoccupied with masturbation worries. Acne on the back and upper part of the chest. Congestion of the throat. Constipation. No free hydrochloric acid was found with the ordinary fractional gastric analysis and a normal rate when histamine was added.

CASE 3.—*Hysteria.*—A girl of 19, student, admitted to the clinic on account of vomiting and poor health. Occasional fainting spells. Recently shaking spells of 15 minutes' duration. On admission appeared listless, cried easily, worried about her physical condition. The gastric analysis revealed achlorhydria which turned into a moderate hypochlorhydria under the effect of histamine.

CASE 4.—*Thymergastic Reaction.* [*Hypomania*].—A woman of 42 admitted to the clinic on 4-10-29, following overactivity and grandiose trend since about 1-15-29. On admission overactive and talkative. The gastric analysis was entirely negative with regard to free hydrochloric acid. Almost a normal rate was found after the use of histamine.

CASE 5.—*Gelineau's Syndrome in Post-Encephalitis.*—A man of 19 admitted on 5-18-28, on account of marked sleepiness, since a febrile illness in the summer of 1922. Recent frontal headaches, difficulty in initiating the urinary stream. Bradycardia. Positive oculocardiac reflex. Complaint of heart-burning. The gastric analysis revealed a moderate hypochlorhydria. The addition of histamine to the ordinary procedure induced a very marked hyperchlorhydria.

CASE 6.—*Depression.*—A married woman of 44, housewife, was admitted on 7-24-28, following development of depression with hypochondriacal trend during pregnancy 10 months before admission. She became worse after delivery. On admission looked tired, worried and complained of abdominal pains. A very slight rate of free hydrochloric acid was found in two specimens, and no acidity in three specimens in the fractional analysis, after the usual Ewald's test meal. With histamine a high normal acidity was obtained.

CASE 7.—*Schizophrenia.*—A man of 28, chauffeur, admitted to the clinic on account of preoccupation with pressure in head and sensation in penis since thyroidectomy was performed. On admission cooperative but indifferent. Marked undernutrition and constipation. Whereas the fractional analysis revealed free hydrochloric acid in only two out of five specimens, the histamine test gave acidity in four specimens.

CASE 8.—*Schizophrenia.*—A man of 22, farmer, admitted to the clinic on 7-1-28, following development of seclusiveness, drowsiness, inability to think and ideas that people were making fun of him. No previous illnesses. On admission cooperative but depressed, preoccupied with ideas of reference. The G. I. X-ray showed a large prolapsed orthotonic stomach; motility somewhat delayed but no evidence of any lesion. No free hydrochloric acid was found after the ordinary test meal and a normal acidity was present when histamine was added.

CASE 9.—*Merergastic Reaction with Depressive Features. Moderate Anemia.*—Married woman of 36 admitted to the clinic on 7-5-29. Following influenza in 12-25-25 the patient failed to recover her strength, had "sinking spells" in which she feared death and worried over tuberculosis, cancer and losing her mind. Severe headaches and insomnia developed and were always associated with the depressed spirits.

The G. I. X-ray examination: Large orthotonic stomach, rather sluggish. Large intestine in normal position but its motility is delayed.

Rbc.	3,530,000
Wbc.	7,000
Hemo.	80%
C. I.	1.14

The fractional gastric analysis revealed the absence of free hydrochloric acid and histamine had no effect whatever.

CASE 10.—*Recurrent Depression with Hysterical and Hypochondriacal Features.*—A single woman of 44 was admitted to the clinic on 12-5-29. Sudden onset on 6-26-26 with depression, insomnia, anorexia. Marked morning and evening variations in mood. Complains of twitching of the arms when excited. Has transient abdominal pains. Marked aerophagia followed by belching. Uterus in retroflexion. With histamine added to the test meal free hydrochloric acid doubled in comparison with the ordinary gastric analysis.

CASE 11.—*Alcoholic Delirium in a Chronic Alcoholic.*—The patient, a man of 42, suffered with gastritis for years. Admitted to the medical clinic on 3-30-30, complaining of pain in the feet and stomach and diarrhea. After a lumbar puncture he became delirious, disoriented, had hallucinations of people trying to kill him, of cats, ducks, etc. Transferred to the Phipps Clinic on 4-2-30, he presented cachexia, tremors, optic atrophy, sluggish unequal pupils, nystagmus, ptosis of the left lid. A slight amount of free hydrochloric acid was found with the ordinary gastric analysis (pH 3.16), and it increased slightly with histamine (pH 2.57). The patient died on 4-25-30, and the autopsy revealed gastritis.

CASE 12.—*Depression in Hepatolenticular Degeneration.*—In addition to his physical disease the untimely death of his sister and brother and domestic unhappiness (infidelity of his wife) contributed to the patient's depression. The gastric analysis was performed once without, and twice with, histamine. No free hydrochloric acid was found. The patient came back to the clinic a few months later. being in nearly the same condition as when he left. Then the first gastric analysis showed a slight trace of free hydrochloric acid. The second analysis with histamine gave a normal acidity, free HCl, 50 cc. N/10 per cent and then two subsequent analyses without histamine showed, respectively, a free hydrochloric acid of 32 and 21 cc. N/10 per cent.

Diagnosis.	Extractions.	Fractional analysis after Ewald's test meal.			Fractional analysis after Ewald's test meal + histamine.		
		Free HCl cc. N/10%	Total acidity cc. N/10%	pH	Free HCl cc. N/10%	Total acidity cc. N/10%	pH
O. I. 1. Organic delirium (Pellagra)?	Fasting After test meal	....	....	....	....	....	....
	1	0	0	7.90	18.0	39.0	1.88
	2	0	0	7.25	10.0	18.0	2.24
	3	0	0	7.12	10.0	18.0	2.28
	4	0	0	6.88	13.0	28.5	2.06
	5	....	....	....	....	....	2.33
H. J. 2. Depression.	Fasting After test meal	....	....	3.99	29.0	41.0	1.81
	1	0	11.0	4.20	5.0	7.0	2.47
	2	0	8.0	5.23	10.5	39.0	1.93
	3	0	10.0	3.87	48.0	56.0	1.50
	4	0	7.0	4.66	5.5	13.5	1.88
G. J. 3. Hysteria.	Fasting After test meal	....	....	....	....	....	....
	1	0	21.0	3.85	0	25.0	3.76
	2	0	23.0	3.51	0	20.0	3.00
	3	0	9.0	5.45	0	55.0	2.41
	4	0	9.0	6.16	9.0	50.0	1.98
	5	0	11.0	6.05	25.0	50.0	1.57
	6	....	....	....	16.0	50.0	1.85
H. H. 4. Thymergastic reaction. (Hypomania.)	Fasting After test meal	0	....	3.52	0	6.0	6.74
	1	0	16.0	3.31	0	2.0	7.90
	2	0	10.0	4.55	35.0	48.0	1.74
	3	0	4.0	6.86	25.0	32.0	2.12
	4	bloody	bloody	7.10	....	....	....
T. 5. Gelineau's syndrome in postencephalitis.	Fasting After test meal	....	....	....	9.0	12.0	2.59
	1	25.5	37.0	1.82	46.0	62.0	1.68
	2	19.0	41.0	1.71	79.0	97.0	1.58
	3	15.0	27.0	1.94	106.0	121.0	1.27
	4	20.0	40.0	1.79	72.0	82.0	1.48

* Alcohol test meal.

54

Diagnosis.	Extractions.	Fractional analysis after Ewald's test meal.			Fractional analysis after Ewald's test meal + histamine.		
		Free HCl cc. N/10%	Total acidity cc. N/10%	pH	Free HCl cc. N/10%	Total acidity cc. N/10%	pH
M. A. 6. Depression.	Fasting	....	....	....	....	....	....
	After test meal						
	1	0	....	3.32	0	21.0	2.82
	2	0	....	4.12	25.0	29.0	1.79
	3	0	....	2.35	36.0	49.0	1.57
	4	+	....	2.15	54.0	74.0	1.34
	5	+	....	2.13	....	....	....
B. C. 7. Schizophrenia.	Fasting	0	....	6.02	....	....	....
	After test meal						
	1	+	....	1.93	34.0	69.0	1.66
	2	40.0	62.0	1.73	29.0	67.0	1.72
	3	0	....	2.32	32.0	70.0	1.79
	4	0	....	2.45	35.0	66.0	1.64
R. G. 8. Schizophrenia.	Fasting	....	....	....	....	....	....
	After test meal						
	1	0	51.0	2.72	21.0	27.0	1.92
	2	0	21.0	7.00	49.0	58.0	1.35
	3	0	29.0	2.33	42.0	67.0	1.35
	4	0	50.0	2.60	37.0	65.0	1.61
D. R. 9. Merergastic reaction with depressive features. Moderate anemia.	Fasting	0	7.0	7.52	0	9.0	7.31
	After test meal						
	1	0	6.0	7.22	0	5.0	7.31
	2	0	7.0	6.53	0	7.0	5.41
	3	0	6.0	6.20	0	15.0	3.95
	4	0	5.0	6.39	0	10.0	3.78
	5	0	6.0	6.30	0	15.0	3.85
	6	0	8.0	5.69	0	20.0	3.61
H. E. 10. Recurrent depression.	Fasting	....	....	....	0	2.0	7.22
	After test meal *						
	1	4.0	6.0	2.47	25.0	35.0	1.71
	2	12.0	16.0	1.95	....	....	....

* Alcohol test meal.

Diagnosis.	Extractions.	Fractional analysis after Ewald's test meal.			Fractional analysis after Ewald's test meal + histamine.		
		Free HCl cc. N/10%	Total acidity cc. N/10%	pH	Free HCl cc. N/10%	Total acidity cc. N/10%	pH
B. P. 11. Alcoholic delirium in a chronic alcoholic.	Fasting After test meal	....	....	....	....	....	....
	1	0	5.0	3.16	0	9.0	2.57
B. S. 12. Depression in hepatolenticular degeneration.	Fasting After test meal	....	....	....	....	....	....
	1	0	0	7.9	0	5.0	7.4
	Fasting After test meal	....	....	....	....	....	....
	1	0	0	7.9	....	....	....
	2	0	0	7.9	....	....	....

The perusal of the records and the tables brings out various points which we shall discuss briefly:

1. When one considers the acidity as determined by the titration method (reaction to Topfer's reagent) one finds achlorhydria in eight cases, whereas the electrometric determination of the H ions concentration (pH) shows achlorhydria in two cases only. This is due to the fact that the titration method does not give any information when the acidity is such as to correspond to a pH above 2.5—3.

Considering that the electrometric method establishes the actual acidity which is the determinant factor of the digestive power of the gastric juice, this method should be used in cases in which the ordinary tests of free HCl are negative. The use of this procedure for determining the gastric acidity will obviously reduce the number of cases with genuine achlorhydria to a great extent.

2. Cases 3, 4, 6, 7, make it clear that it is absolutely indicated to apply the fractional Rehfuss test instead of a single extraction from

45 minutes to 1 hour after the test meal. In fact in these cases free hydrochloric acid was absent in some specimens and present in others. We made single extractions, after the test meal with and without histamine, in two cases only, on account of the lack of cooperation on the part of the patients (11, 12).

3. The histamine test was of valuable aid in the investigation of the gastric secretion in all of our cases. In the cases of hypoacidity (5, 6, 10), with the ordinary Rehfuss test, histamine induced hyperchlorhydria in Case 5, normal acidity in Case 6, and a marked increase of free hydrochloric acid which did not, however, amount to a normal level in Case 10. We were somewhat puzzled by the hypochlorhydria in Case 5 on account of the complaint of heart burning and of the presence of other vagotonic symptoms. The histamine test brought support to the clinical impression that the patient was prone to hyperchlorhydria. In our cases of achlorhydria, as determined by the Topfer reagent, histamine provoked either a normal acidity or a reduced one in those cases (2, 3, 4, 8) in which there were no apparent symptoms of organic involvement of the gastric mucous membrane. Thus the histamine test substantiated the clinical impression of a functional achlorhydria. In Cases 1, 9, 11, 12, one deals with somatic conditions in which impairment of the gastric mucous membrane was suspected. The test with histamine revealed a moderate secretion of acidity in Case 1, and seemingly brought support to the diagnosis of organic achlorhydria in the remaining three cases. In Case 11 gastritis was found on the post-mortem examination. The results obtained in Cases 9 and 12 need, however, to be commented upon.

In Case 9 the absence of free hydrochloric acid is associated with a moderate anemia (Rbc. 3,530,000), and a color index above the normal (1.14), suggestive of anemia of the Biermer type. We do not, however, regard these data significant enough to warrant the conclusion that the achlorhydria is altogether of organic origin. For one also may assume that the nervous inhibition of the secretion could not be overpowered by the dose of histamine used. A higher dose, or the same one administered at another time, would perhaps have been effective. We made such an observation in Case 12, in whom during the first stay in our clinic his achlorhydria was not influenced by histamine. Considering his somatic

condition we believed in the organic nature of the achlorhydria. The strong effect which histamine had (free HCl 50 cc. N/10 per cent) during the second sojourn, a few months later, proved the functional origin. The two subsequent gastric analyses without histamine, showing free HCl respectively 32 and 21 cc. N/10 per cent bring additional support to this view. Similar findings have been recorded by Henning [2] in a case in which the histamine test was used three times. In the first examination there was a distinct increase of free hydrochloric acid; the second test gave almost a negative result and the third yielded a moderate amount of free HCl.

This case and ours illustrate the well-known possible fluctuations of the gastric secretory function. The lack of response of the gastric secretion to histamine may reasonably be accounted for by changes in the tone of the vegetative nervous system with such a predominance of the sympathetic part, that the parasympathetic component becomes impotent to react even to such a powerful vagus stimulant as histamine. These two cases also demonstrate that a negative response to histamine does not necessarily signify definite inability of the gastric mucous membrane to secrete free HCl.

The diagnostic significance of the histamine test may thus be characterized as follows:

Only a positive response is conclusive, pointing to the functional origin of the deficient secretion revealed by the routine gastric analysis.

A negative histamine test is not decisive and should be repeated, using the same or a higher dose.

The fact still remains proved that in most cases histamine induces the secretion of free hydrochloric acid, as far as the gastric mucous membrane is able to secrete.

[2] Henning, N.: The histamine test and the prognosis of achlorhydria. Münch. Mediz. Woch. 1928, No. 41, p. 1752.
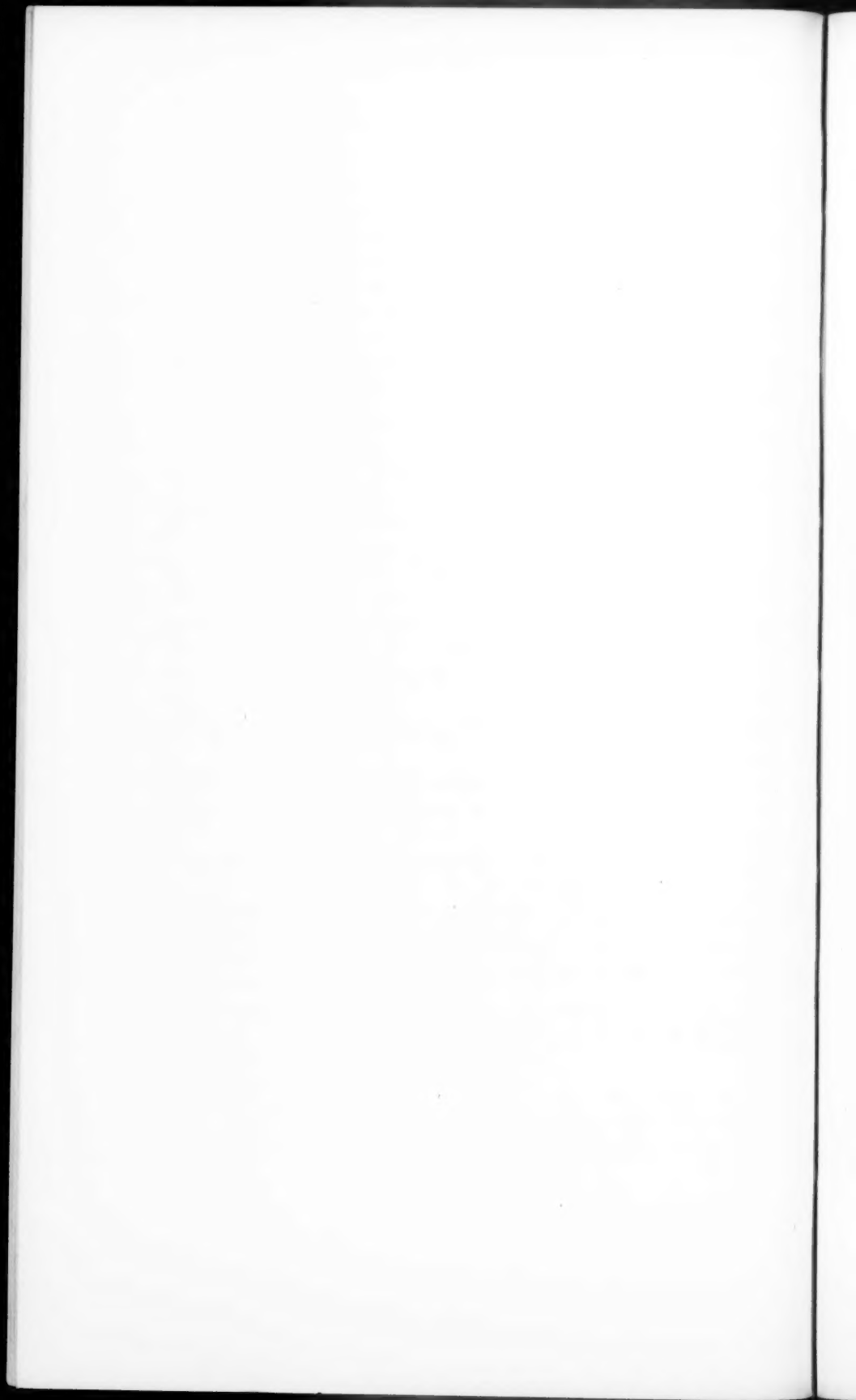
PERSONALITY-TESTING IN THE LIGHT OF THE SITUATIONAL APPROACH.

By MAURICE H. KROUT,
Crane Jr. College, Chicago.

i. The Meaning of Personality.

The term *personality* has been variously discussed in the literature. Kempf, in his " Psychopathology," holds that personality consists in the habitual modes of adjustment effected by the individual between his egocentric drives (repressed ego) and the exigencies of his physical and social environment (manifest ego). Kempf stresses the importance of the autonomic system and the mediation by the central nervous system of the relations between the organism and its surroundings. Though this view does not neglect the individual's social contacts, yet it does not properly emphasize them. Other definitions give the social aspects of the individual life more prominence. Thus F. H. Allport in his volume on " Social Psychology " speaks of personality as " the individual's characteristic reactions to social stimuli and the quality of his adaptation to the social features of his environment." This view may be said to be, in a sense, summational, since it refers to personality as to all the characteristics which have social significance— that is to say, which are influenced by or which influence individuals. In another sense, it is also atomistic, since it stresses the quality of the separate adjustments by which the individual is known. Bernard, in his " Introduction to Social Psychology," defines personality as " the general term describing all conceivable aspects of the individual's behavior. . . . . Personality (he adds) includes anything which can function in an attitude or in action. It is the functioning self or selves, for personality is ever changing as condition and situation, as organism and environment, change." This definition is broader than the others, and does not limit itself to any specific phase of behavior, implying merely that if specific phases are discoverable, personality includes them all. Kantor, in his recent " Outline of Social Psychology," offers this definition: " Every organism . . . . develops during the course of its reac-

tional history a complement of specific function-systems which we call the personality equipment. This behavior equipment, as potential responses capable of being actualized into movements, postures, attitudes, speed, and thought, constitutes the psychological personality." This definition is significant for its emphasis on the forms of behavior which can be used in the study of personality. It is also interesting because of its implication that personality is a product of the concrete situations in which the individual has functioned rather than of inner processes detached from reality.

We might well borrow Kempf's emphasis on adjustment as the reconciliation of the individual to the social pressures under which he labors. From Allport we should accept the reference to personality as to all the factors which have social significance. In Bernard's definition we find an insistence on change as a necessary aspect of personality. Kantor's definition, more than any other, is marked by objectivity; and the view it represents that personality is a complement of reaction-systems acquired by the individual as a result of experience is indeed worth noting. Combining these definitions we may say that personality is a term referring to the persistent adjustments of an individual, which are evidenced in certain explicit (movements, postures) and implicit (attitudes, images) responses subject to the conditions under which they occur and subject to change under new conditions.

2. Personality Traits in the Literature.

A survey of standard texts in psychology reveals to us three characteristic approaches to the problem of "traits." Since the term has found its way into technical literature comparatively recently, the older texts—whether representative of structural psychology, like Titchener's, of functional psychology, like James' or Angell's or of self-psychology, like Calkins'—contain no mention of it. But even some recent texts treat it similarly. Pillsbury's "Essentials of Psychology" (1930) and Young's "Social Psychology" (1930) do not deal with the term; and Hollingworth's "Psychology: Its Facts and Principles" (1928), while it speaks briefly of "character traits," does not mention the term or any of its synonyms. The term *personality* itself is omitted in this book.

The majority of the authors of current texts discuss the term "trait" or some of its many synonyms, such as abilities, factors, components, characteristics, capacities, elements, etc., with various degrees of emphasis. In this class belong Carr (1925), Perrin and Klein (1926), Phillips (1927), Ewer (1929), Rexroad (1929), Watson (1929), Woodworth (1929), Bridges (1930), and Schoen (1930). These authors employ the term without any evident doubt as to its usability or any qualification as to its implications.

There is a third group of psychologists who treat the term more or less critically, either denying it a place altogether, after defining it, or admitting it with various reservations or apologies. Among these we find Dashiell (1928), Gates (1928), Robinson (1928), Kantor (1929), Wheeler (1929), and Warren and Carmichael (1930).

Historically the analysis of individual behavior into fractions of one kind or another goes back to the faculty movement in psychology. The determination of the so-called "faculties" by reference to characteristic structures of head or hand is the concrete expression of this movement. In the writings of C. B. Davenport we find, comparatively recently (1912), the attempt to analyze behavior into a vast variety of subdivisions among which tics, general affability, and love for fishing are assigned approximately similar positions as aspects of personality. What is particularly interesting is that Davenport himself states that the social sciences will attain to the position of the physical sciences only when they reach the stage of precision in terminology. Other inventories consist of no less "reckless arrays of non-comparable factors." Among these belong Edman's "Human Traits and Their Social Significance" (1920) and Thomson's "The Springs of Human Action" (1927).

The development of point and age-scale standards gave the initial impetus to the measurement of personality traits. Terman's army rating-scale and others seeking correlations between character and intelligence or personality and intelligence naturally led to the construction of lists of "measurable traits" and even to the suggestion that a P. Q. (personality quotient) be adopted as a complement of the I. Q. in every case. The motive was indeed a noble one. It was becoming increasingly evident during and immediately following the European war that I. Q.'s alone did not tell all that

was to be known about the adjustment possibilities of human beings. In 1917 Wells came forward with an elaborate analysis of human experience into 14 modes of adjustment subdivided into 94 traits subject to measurement; and Partridge soon presented a revised and somewhat lengthened list. Spaulding and Porteus (1921 and 1920, resp.) constructed similar lists intended for use in the practical treatment of delinquents and defectives. The writer himself offered a contribution along this line in 1926.

As the development continued the lists of traits assumed weird and unintelligible forms. *"Physical traits"* (such as size, weight, build, bodily posture, facial expression, health, strength, stamina, efficiency of sense organs, speed and dexterity of motor response), *mental functions* (such as intelligence in its broadest sense, memory, imagination, judgment, reasoning), *special aptitudes* (such as vocational abilities and recreational interests), *character* (including moral and ethical beliefs and opinions), *sociality* (reactions to appearance, words, expressions, conduct, and attitudes of other people as shown in the usual dichotomies of sympathy-indifference, graciousness-crudeness, boastfulness-modesty, sagacity-stupidity, expansion-reclusion, etc.), *temperament* (moodiness-calmness, flightiness-eventemperedness, excitability-complacency, cheerfulness-pessimism, courage-timidity, etc.), and finally, *volition* (tenacity-vacillation, determination in the face of discomfort, etc.) all came to be emphasized severally and collectively as measurable "personality traits." Numerous investigations have been conducted on the basis of these "trait lists," and the literature has grown heavy with reports of the results obtained.

3. The Assumptions with Regard to Traits.

As long as psychologists kept the matter of traits in the descriptive stage no accurate study of personality was possible, for such a study presupposes generalization upon concrete facts and not merely their description. In passing from a descriptive sampling of individual reactions to a quantitative analysis, psychologists have made some important assumptions. These assumptions, found scattered in the literature, are not to be credited to any one person or school of psychology. They are principles which, in the course of time, have crept into the theory and the techniques of psychologists

without any awareness on their part either of the sources or of the results of their information. Some more or less correct, some utterly fallacious, they could be summarized in the following way :

a. The functioning individual can be analyzed into qualitatively diverse units termed " traits."

b. There is general agreement as to what a " trait " is, and there is general understanding of what the different " traits " represent.

c. Individual differences are quantitative, not qualitative ; and in the last analysis individuals amount to different quantitative combinations of certain " traits."

d. All traits are simple and unidimensional, and subject to measurement.

e. Variations in traits are wide, continuous, and represented by a distribution ranging from one extreme of the scale to the other in such a way that the traits cluster around a central tendency, and thin off toward each extreme.

f. Traits are independent of each other, possess meaning as separate entities, and need not necessarily correlate with each other in a given personality test.

g. The reliability of rating for all traits is approximately the same, and in most cases is fairly high.

h. The reliability of a test for " traits " is more important than its validity, the test proving itself by its application in concrete instances.

i. Being measurable, the " traits " are actual, demonstrable existences.

j. The " traits " are uniform for all situations, stable, and constant.

k. The " traits " reside in specific grooves, and can be activated by a given stimulus.

l. The integration of the organism is a fiction which finds no confirmation in reality.

To the examination of these claims we shall devote the rest of this paper.

4. FALLACIES IN TRAIT MEASUREMENT.

Those who are interested in the measurement of traits have generally held that the functioning individual can be subdivided into

qualitatively distinct units and that these can be studied with some
degree of validity and exactness. It is indeed doubtful, as will be
shown later, whether the human personality can be split up into
qualities as separate units of analysis. But as yet it is not clear
what these units are to be. To some psychologists they are purely
structural (physique), and the individual for them is divisible into
physico-anatomical parts or organs; to others the units are purely
functional, and the task is considered either a matter of physio-
logical behavior—implied in endocrine activity or neural proc-
esses—or a matter of reaction of the total individual to a given
situation. In some cases indeed the latter viewpoints are not
distinguished from each other, and two units of analysis are
employed simultaneously in the same test of "traits." Even if
we assume a point-to-point correspondence between physiological
(systemic) and psychological (organismic) behavior, we must
still admit that we cannot approach both types of behavior with
the same tools at the same time.

Judging from the multiplicity of synonyms for the term *traits*
(previously listed) and from the great variety of lists of traits
favored by different investigators, we cannot help concluding that
there is no uniformity of opinion as to what a trait is and as to
what the traits so assiduously cultivated and so diligently mea-
sured actually represent. The reason for this is that the term in
question, like so many other terms in psychology, originated in
common sense and, finding its way into psychology, placed psy-
chologists under the obligation of imputing to it *some* scientific
content. Losely defined by the laity, it could not of course retain
its original meaning, and new meaning is always a matter of new
function; hence, the psychologists began to put the term through
a variety of " functions." But the many ways in which the term
has been used promise little for its future use. *What* human
beings do, what other *think* they do, what *value* what they do
seems to have, and what *effect* what they do seems to have on
others—all these have been used generically as criteria for the
selection of " traits." Is it surprising that the long-suspected
differences between individuals have thus found striking corrob-
oration at the hands of the many investigators interested in
" trait analysis "?

To say that individual differences are quantitative and not qualitative is to allign oneself with a viewpoint which is at once reasonable and helpful. There is still some disagreement however as to whether "traits" are quantitatively or qualitatively diverse, the majority opinion inclining toward a neutral position on the matter. But to assume, as some do, that individuals differ in all measurable "traits," whether these be height, spelling, athletics, nervous stability, or intelligence, is to reiterate a known truth in an unfamiliar way. The important thing is that people differ and not that they differ in every respect, since to say the latter is hardly to add anything to the former. On the basis of this premise we surely cannot say whether in the end individuals will prove to be "different combinations of identical traits," for we are as yet far from knowing what the sum-total of "traits" is in any individual and whether the *totality* of "traits" does not add anything to the *total number* of "traits."

What applies to differences in traits applies also to their simple and unidimensional nature. The statistical definition of a "trait" is that it is one aspect of personality, isolated from all the others and from the general integration of the personality, and measured by proceeding from more to less in a linear sequence, thus yielding curves and correlation charts. Aside from the fact that what is studied here is the degrees of something whose quality is anything but definite, it appears that, as a matter of actual practice, most of the "traits" found in the literature could not be distributed in unilinear fashion, because they either presuppose their opposites or actually come tied in pairs of opposites. For purposes of accurate measurement it is of course essential that the units be unidimensional, because of the relativity of meaning and the possibility of error due to various degrees of difference in meaning as between the two extremes.

To be measurable "traits" must be unidimensional; that is to say, they must possess meaning without one another and without the totality which they compose. Statistically it is expected that every "trait" correlate, in a given age group, to the extent zero with all the other "traits." All quantitative studies thus far seem to recognize this, though procedures have necessarily been vitiated by the tacit assumption of complexes of traits. If it were possible

to isolate the " components " of an individual nature and rate them independently of all the other aspects of this nature, it would not be permissible to do so without the authority of a high correlation coefficient between the trait measured and all co-existing " traits." In no sense can quantitative distinctions outrun qualitative distinctions. If they could, a separate scale would be necessary for *each* individual " trait " which, obviously, is not in keeping with the aim of statistical students.

The belief that the validity of rating- and testing-scales is approximately the same for all " traits " is also in error. The validity of rating varies with the " traits " considered; for, as stated, raters disagree on the meaning and measurableness of different " traits." Besides, the validity could not be the same as long as some individuals are easy to rate and others are less so. And validity is more important that reliability. Before a test of any sort can become reliable for general use it must justify its existence by proving itself valid. Of course, there are some objective tests for validity such as checking against an outside criterion and checking for what Thurstone has designated as " internal consistency." But the " trait " testers have given evidence of too direct a purpose, and have accordingly sought reliability first. Of course, reliability assumes validity, but many a test now abroad in the land has been established as reliable but lacks in the fundamentals of statistical validation. The authors of these tests seem to take the attitude: " I don't know what I'm measuring, but I'm sure to measure it accurately." Only after validity is established can we determine whether a test actually measures something.

5. THE TRAIT AND THE SITUATION.

The first step in the establishment of validity is the precise definition of terms. This raises again the fundamental question as to whether " traits " can be satisfactorily defined, and if so, whether they are actual, demonstrable existences which can be measured. Performances of individuals indeed are actual, and a given performance may be characterized abstractly (as velocity, mass, and others are characterized in physics), and so may be measured. But when " traits " which have meaning only as performance are confused with ability or power assumed both to

inhere in the performance and to be somehow different from the performance as such, then " traits " do not exist. Objective psychology cannot concern itself with " traits " as powers or abilities, for it can ill afford to be guilty of reifying abstractions. To be sure, " traits " are not abstractions in the sense that they constitute a view of the personality in which all phases are disregarded except one which is singled out for analysis, for in this sense they would do violence to facts as they are. Nor are they abstractions in the old " faculty " sense of the term (notwithstanding such " traits " as neatness, beauty, humor, refinement, conceit, or vulgarity), for evidently performance is the only abstraction justifiable. " Traits " are nominal existences even in this sense, but as performance they refer to an existential unit which is well within the bounds of natural science.

In the natural science sense of the word, a so-called " trait " is an attempt to label a form of action which has developed as a result of what Kantor calls the " reactional biography of the individual." It is true that a " trait is not known by its cause but by what it causes," but its cause is still of no mean importance, for the personality is as much a resultant of the particular events and situations in which it has functioned as it is of those in which it functions at any given time. It is presumably in recognition of this fact that Symonds has proposed in " The Nature of Conduct " (1929) the term *confacts* as a substitute for that of *traits*. This term, stressing the constancy of individual response to common elements in different situations, would seem hopeful if it did not evade the possibility of personality mutation and did not fail to stress all factors as functions of the situations in which they appear.

" The situation is the thing." In any legitimate sense the term *trait* may be used as descriptive of the interacting personality, and this must be regarded as of the *situation* and not in any private sense of the *individual*. Types of reaction may be studied in typical situations, but both the reaction and the situation may change, and when either changes, so does the personality. The practical significance of this became evident in the recent study of a competent investigator (Queen, 1930) who reported that he had attempted to define interaction processes first, in terms of individual habits and

later, in terms of attitudes as currently defined, but that he secured a meaningful set of data only after he had decided on the situational approach.

The personality does not react *to* any one factor in a situation. Furthermore, the personality reacts *as* a part of a total situation. " Traits " then are not " responses conditioned upon specific stimuli which must be defined in terms of a particular stimulus and a particular response," as some objective psychologists (Perrin and Klein) hold. When regarded in this way, " traits " become entities residing in specific habit-grooves which may be activated at any time by a specific stimulus. This assumption seems unwarranted, for a stimulus takes its meaning from the situation in which it appears, and in different situations will stimulate differently. Realizing this, one psychologist has suggested that " to gauge any one trait under any one category it is necessary to test the individual's reactions in several different situations " (A. I. Gates). But he has overlooked the fact that the sum of a number of *varying* specific reactions could not equal one abstract reaction.

The personality not only reacts to the total situation but reacts to it as a totality—that is to say, as an integrated unit. The literature seems to show that atomistic psychology is still far from unpopular, for one finds occasionally that behavior as the response of the whole organism is treated as a fiction. The claim made is that no organism is ever wholly integrated ; in other words, that integration is a matter of degree (English, 1926). Some statistical studies in search of indices of integration have found support for this assertion in the discovery that the variability measured within the individual is 80 per cent as great as in a normal group, and that some individuals are twice as variable as others (Hull, 1927). The difficulty here consists not so much in the logic or in the procedure used as in the neglect of the probable changes in the situations which gave rise to the changes within individuals, and to the fact also that the data obtained for groups and those obtained for individuals are not strictly comparable.

The objective position in psychology is based without qualification on the proposition that " Whenever any form of psychological action occurs, whether it be crude or subtle, there is a complete and total operation of the animal organism " (Kantor). Two cautions

seem here in order however. There is danger in attempting to equate two reactions of the total personality on the grounds of its theoretical unity. This is probably what the matter of " halo " discussed in recent literature, in the last analysis, means. Another caution must be noted. The abnormal personality ranging as it does from relative dissociation to total disintegration does present evidence of fractional behavior, that is to say, of behavior in which the organism, at least in a psychological sense, does not *seem* to operate as a whole. If we take it for granted that the normal is continuous with the abnormal, then, the question arises, Could we not speak of the individual as at times more and at times less organized? The answer must be given in the negative, for the evident disorganization or disintegration of the individual is due to the way in which the situation is perceived by him rather than to the way in which he responds to it by attitude or movement. Every response is the result of both a collective apprehension of stimuli and a meaningful motor structuralization (Koffka). When the organism is structuralized for activity it has apprehended the situation, but this apprehension may not have been inclusive of all the factors apprehended by an adjusted individual.

Integration is then a fact with which students of personality must reckon. Most of them indeed do so, including the behaviorists who, while using the term *integration,* still refuse to give it meaning. The fact that behaviorists define personality as some variation of the dictum " man as a whole " does not prevent them from splitting the " whole " into variously labeled artificial particles. This, to be sure, is undesirable ; and yet could not the personality be regarded in terms of dimensions of behavior as units of the individual's persistent adjustments in social situations? In the present usage these dimensions are not traits in the sense previously criticized. In the sense here implied dimensions of behavior refer to muscle movement, or posture, or attitude (belief, opinion), or thought, or some similar reaction form constituting a part of a type situation (or pattern) in which the personality is being activated. There is no advantage in treating artificial constellations as specific functions when in reality they do not exist and cannot be measured in a valid way. The treatment of the personality in terms of reactional

55

aspects relative to situations in which they function, or in which they have functioned, is not only more logical but more promising as well.

6. ULTIMATES IN PERSONALITY STUDY.

Several test-procedures used today could be adapted to the purposes set forth in the preceding section, while some of course are not as promising. In the latter class belong inferences from anatomical structure, self-ratings, and questionnaire methods. Inferences from anatomical structure cannot be said to have given dependable correlations or insights into the nature of human conduct ; for structure, instead of being an index to function, *is* function in a certain form, and is understandable only as such (42). Self-ratings are subject to all the shortcomings of the theory that the personality is capable of functioning apart from a given situation as it would within it. This defect is indeed found in other procedures (such as word-association), but some of these have the redeeming quality of objectivity gained through the aid of another person and the indirectness of the technique employed. Questionnaires, when filled, become records of falsifications or rationalizations due to the enhanced self-feeling of the individual and the artificiality of the testing situation. At best these represent artificial verbalizations.

Reactions to selected words and autobiographical accounts, prerequisite to a complete study of the personality, and observed reactions to typical life-like situations, are the only promising methods of objective study. For only developmental accounts, and cues obtained in actual situations, can yield objective data for personality study. Observations may be conducted from the point of view of verbal behavior, from the point of view of body-postures, or from the point of view of muscle movement ; but, in any case, it is not an isolated trait that one must or can study, but the person in the only form in which he is known to exist—that is to say, as a whole.

Here a word should probably be said about the increasing popularity of statistical procedure as compared with other known procedures applicable to psychological data. Statistics may be used to establish standard achievement averages, distribution, and variation of what is tested. Within limits, prediction may be ventured

and the error of prediction established. But of all the varied aids which statistics offer to the psychologist Pearson's relational index is obviously the most significant. The coefficient of correlation is a necessary first step in the study of behavior, for it offers multiple cues to causally interdependent sequences of behavior facts, which are ultimate desiderata in psychology. Statistical correlation serves not only as an objective check, where possible, on logical assumptions, but indeed logical assumptions may flow from statistical correlation indices. Thus statistics may serve both as cues and as tests of validity in research procedure.

Statistical correlation brings out the presence of certain coterminous or coexistential factors and gives a mathematical index of the amount or volume of the factors present. It does not admittedly show the *direction* of factors correlated, in a sequential sense, and it does not exclude the possibility of a third factor, common to two factors correlated, to which they both stand in the relation of antecedent and consequent. This would indicate the necessity of other methods as supplementary to the statistical in psychological investigation.

In every case statistical norms must be followed with a genetic and a comparative analysis of behavior. Individual reactions gain their meaning from the spatial as well as from the temporal setting. It is in terms of both that we must hope to obtain scales for the tabulation of specific data. Any attempt to study personality would be futile if it did not include

  I. *From the point of view of spatial or proximate relations*
    1. A *statistical* index based on
      a. Measures of central tendency or trend in responses to typical situations.
      b. A correlation of data derived from a study of the subject in these situations with the established norms :
 II. *From the point of view of temporal or long-range relations*
    1. A *genetic* index based on
      a. Known sequences of behavior discovered in the fundamental relations into which individuals enter.
      b. Comparative data derived from a developmental study of the subject analyzed in the light of formulated behavior-sequence norms.

7. Summary and Conclusion.

Defining personality as a system of persistent adjustments of an individual, evidenced in explicit and implicit responses to given situations, we proceeded to examine the current methods of approach to the measurement of personality. We found the majority of psychology texts asserting the existence of personality traits as aspects of the social relations of the individual in much the same way as psychologists, or those psychologically inclined, once asserted the existence of faculties in relation to intelligence. An analysis revealed a great variety of traits ranging from physical structure to volition.

Before examining the shortcomings of testing methods we summed up the assumptions as to the nature of personality traits. We found these to refer to the independence and specificity of traits for all situations and to the reliability of tests of traits. The first objection to these assumptions was found in the multiplicity of meanings ascribed to traits as units of analysis. Another was found in the fact that traits cannot be defined apart from one another, even if statistical procedure demands that this be done. Lastly, we could not agree that mere reliability of present-day tests meant that the latter possessed validity as scientific concepts—in other words, that the tests actually measured something.

In an attempt to decide what is and what is not valid as an aspect of personality we have contrasted the trait approach with the situational approach. Since traits as used by testers are reified abstractions they cannot be said to be legitimate subject-matter for psychology. If it is labels for action that we are seeking we are indeed justified in our search, but then we must decide how action is to be approached. Accordingly the situational viewpoint is presented. The human personality as a system of persistent responses is always (a) relative to a type-situation or situation-pattern, (b) part and parcel of the situation-pattern, (c) based on the individual's rôle in the situation, as defined at least in part by the relationship into which the individual enters, and (d) a response to the total situation as the individual, in view of his experience, perceives the situation. The study of personality, to be valid, must therefore be a study of the individual as a whole related to the situation as a whole. The approach objectively may vary according

to the several dimensions of the personality, viz., muscle movement, posture, attitude, or thought as forms of reaction to given situations.

The chief difficulty in personality study consists in the selection of stimulus-situations which would yield typical results. The tests in use at present differ in this respect also. Some base themselves on verbalized or otherwise symbolized situations, some on artificial configurations improvised for special purposes, and some on life-like situations. Needless to say, the last is the most valid. Morphological indices, self-ratings, and questionnaires are consequently of little value as tests. Statistical studies of dimensional behavior, in terms of position or movement through space, and genetic studies of attitudes and imaginal constructs, in terms of movement and position in time, are both promising if used in supplementation of one another. So used they should ultimately yield scales of measurement and qualitative standards for the accurate diagnosis of personality.

A beginning in this direction has already been made in a variety of suggestive psychiatric, psychoanalytic, and sociological studies; but there is much ahead of the investigator concerned with the study of human nature. There is an endless number of problems for which any or several methods now known could be utilized. For the present, and until the genetic and the statistical procedures, sharpened by greater insight into human motivation and supported by a sizable body of objective data, can be brought to the aid of the psychologist, the study of the human personality must continue to be largely empirical and very largely non-valid.

BIBLIOGRAPHY.

1. Allport, F. H.: Social Psychology, 1924, chapters 5 and 6.
2. Allport, G. W.: Personality and Character, Psychological Bulletin, XVIII: 441-454. 1921.
3. Allport, G. W.: Concepts of Trait and Personality, Psychological Bulletin, XXIV: 284-294, 1927.
4. Chassell, J. O.: Experience Variables: A Study of the Variable Factors in Experience Contributing to the Formation of Personality, Rochester, 1928.
5. Dashiell, J. F.: Fundamentals of Objective Psychology, N. Y., 1928, ch. 18.
6. English, H. B.: Is a Synthesis of Psychological Schools to Be Found in a Personalistic Act-Psychology?, Psychological Review, XXX: 298-307, 1926.

7. Hull, C. L.: Variability in Amount of Different Traits Possessed by the Individual, Journal of Educational Psychology, XVIII: 97 ff., 1927.

8. Kantor, J. R.: Outline of Social Psychology, Chicago, 1929, ch. 6.

9. Kempf, E. J.: Psychopathology, St. Louis, 1920, ch. 1.

10. Knight, F. B., and Franzen, R. H.: Pitfalls in Rating Schemes, Journal of Educational Psychology, XIII: 204-213, 1922.

11. Koffka, K.: The Growth of the Mind, New York, 1925, ch. 4.

12. May, M. A. *et al.*: Personality and Character Tests, Psychological Bulletin, XXIII: 395-411, 1926; XXIV: 418-435, 1927; XXV: 369-378, 1928.

13. Symonds, P. M.: The Nature of Conduct, N. Y., 1928, ch. 15.

14. Thurstone, L. L.: Attitudes Can Be Measured, American Journal of Sociology, XXXIII: 544 ff., 1928.

15. Queen, S. A.: A Study of Conflict Situations, Proceedings, American Sociological Society, XXIV: 56-64, 1930.

16. White, W. A.: The Meaning of Disease, Baltimore, 1926, ch. 3 and 8.

17. Watson, G. B.: Experimentation and Measurement in Religious Education, New York, 1927, chapters 3, 4, 5.

PSYCHOLOGY AND BIOGRAPHY.*

By C. MACFIE CAMPBELL, Boston.

Psychiatry has sometimes reproached psychology with not giving it the same help which clinical medicine receives from physiology and the medical sciences. Academic psychology has often seemed to be engaged, to a disproportionate extent, in investigations which had little relationship to the more important issues of life, and in regard to the latter to have little to say.

Of recent years psychology has been showing an increasing interest in problems which have a very close relationship to the field of work of the psychiatrist. Many important issues, however, are not easily dealt with in the laboratory, and other data with regard to human reactions may be of use to supplement the more precise and accurate observations of the laboratory; thus many data scattered through the biographies of unusual individuals are of value to the psychiatrist.

The difficulty with such data is that they do not fulfill the conditions of exact laboratory observation. There is no adequate guarantee of their authenticity. The observations are not strictly controlled like the observations of a scientific experiment. On the other hand, while not fulfilling the most rigid conditions of control, they are entitled to a certain respect.

To the psychiatrist, biography is of particular interest, as it gives him a broader view of what the possibilities of human life are; it shows him that outside the clinical field there are a great many experiences which form part and parcel of the varied texture of human life and which are not monopolized by the patients of the psychiatrist. Thus Galton has emphasized the frequency of hallucinations among those who are not insane.

In some cases a biography may have the significance of a clinical record and the biographical details may be altogether subordinated to the presentation of a special period of mental disturbance, the general biographical material being merely to give a background to the account of the disturbed experience. Thus Mr. Beers, in "A

* Read before the New England Society for Psychiatry, October 14, 1930.

Mind That Found Itself," has presented us with an extremely interesting clinical document, giving us a good deal of insight into the mind of the patient himself. " Jane Hillyer " in " Reluctantly Told," and Mrs. Emily Holmes Coleman in " Shutter of Snow " present similar reports.

In Gérard de Nerval's work " Le Rêve et La Vie " the author plunges into the account of his mystical experiences with no preliminaries at all and with no attempt to relate the phenomena to preceding events. He presents his psychosis as a marvelous adventure into psychic realms.

In " Thy Rod and Thy Staff " A. C. Benson gives a detailed account of a long depressive experience which is interpreted in an orthodox religious way.

The authors referred to had experienced a well-marked psychosis and present a material which is perhaps familiar enough; the material, however, is presented from an important angle, that of the patient.

In other biographies one comes across interesting episodes, which are not specially emphasized, but which are described incidentally in the setting of the whole life of the individual. The data may cover more or less minor characteristics or episodes in the life of the individual, or they may deal with fundamental traits of personality; in their totality they form a body of psychological information which is of some value.

The following examples are taken more or less at random from the wide field of biographical material available.

RICHARD WAGNER.*

There are interesting psychological data scattered throughout the autobiography of Wagner. From a child he was very much interested in the theatre. The Freischütz of Weber with its spooky subject had a very marked influence on the boy's imagination.

" The thrills of horror and of ghostly fear form a quite special factor in the development of my emotional life. From earliest childhood certain inexplicable and uncanny occurrences made an extreme impression on me. I remember that if I remained a considerable time alone in a room and my attention became fixed on

* Mein Leben. von Richard Wagner, F. Bruckmann, München, 1911.

certain pieces of furniture I shrieked suddenly from fright because they seemed to me to be alive. Not a night passed until late boyhood without my waking from some dream of ghosts, with frightful shrieks which would not stop until a human voice ordered me to keep quiet. The most severe scolding, yes even corporal punishment, appeared to me then as kindly acts of rescue." None of the family wished to continue to sleep near him.

As to his relationship with his fellows, it is interesting to find that what might appear to be the behavior of an extrovert was perhaps based upon a distinctly intraverted personality.

During his adolescence he made many casual acquaintances but there was no deep bond between him and his comrades. He found it useful to have some comrade to whom he could pour out his views, but felt he never got any return from the comrade and when he tried to encourage such a return the relationship was usually broken off. " Since a lasting personal relationship of friendship never came into my life it is intelligible that for a long time I indulged in a wild student life, because in this the individual element of intercourse is swamped in the general relation of the total group. In the midst of the turmoil of the noisiest dissipation I remained quite alone ; and it is possible that these foolish experiences formed a protective crust around my inner core which for a somewhat long period required the natural growth of strength in order not to be prematurely weakened through precocious productivity."

For several months during his student life he devoted himself passionately to gambling and lost heavily. He felt that he could only straighten out his situation by staking larger sums. For this purpose he took a sum which his mother had entrusted to him which was part of her pension. In one night he lost all that he had brought, to the last thaler. " The excitement with which I finally played this last thaler on a card was completely new to my young life, notwithstanding all my other experiences. Without having taken any drink at all I had several times to rise from the gaming table in order to vomit." His life was at stake on this last thaler because he could not think of returning home empty-handed. Luck had turned, he began to win. He took great risks, felt that he was bound to win, and it suddenly occurred to him that this would be the last time that he would ever play. He was so successful that

the bank closed. He gained not only all the money he lost that night but enough to pay all his debts. " The warmth which during this experience increasingly filled me was altogether of a sacred nature. With the change in my luck I felt clearly God or His angel, as if standing beside me, whispering to me His warning and consolation." He went home late, awoke refreshed and as if born again.

It is interesting to find a religious significance given to this successful issue of a gaming experience which seemed to have so little of spiritual value.

In the summer of 1832 at the age of 19 he spent a night alone in the town of Brunn on the road to Vienna. There he unexpectedly learned that cholera was prevalent. He was suddenly overwhelmed with fear of cholera; he felt as if some malicious spirit had lured him to this trap to meet his doom. " When one took me to a very remote wing of the inn to my bedroom and left me alone in this wilderness I buried myself, all clothed, in the bed and experienced again everything in the way of fear of ghosts which I had suffered in my childhood. The cholera stood in bodily form before me : I saw her and could grasp her with my hands ; she came to me into the bed and embraced me ; my limbs froze, and I felt myself dead to the very heart. I am quite unable to decide whether I was asleep or awake : I was only extremely surprised at break of day to find myself alive completely well."

In his early love life he emphasizes the importance to him of his sister Rosalie. He talks of a tender and almost enthusiastic love for her. In 1833 on the return of his brother from Paris he was asked to let his family hear something of his opera Ada. It was not easy for him to present this without getting into a somewhat ecstatic condition. " Rosalie knew that I had meant this as a sort of declaration of love to her. I am not sure whether the embrace and the sisterly kiss which rewarded my great aria of Ada after I had sung it was given to me owing to real enthusiasm or more out of loving consideration."

An interesting experience which illustrates a certain doubling of the personality is given by him in some detail. In December, 1844, at the age of 31 on the reburial at Dresden of the mortal remains of Karl Maria von Weber after their removal from London Wagner made his first formal public speech. As he wished to present cer-

tain definite propositions in a very brief form, he had written his speech down and committed it to memory. His mind was so full of his subject that he trusted his memory completely and made no arrangements for being prompted. "After I had begun my speech clearly and with a full voice I was for a moment so affected by the effect which my own utterance, its sound and its accent made upon me that I had the impression in a completely detached condition that I could see myself facing the breathlessly attentive crowd as I could hear myself, and while I made myself in this way an object to myself I waited in a condition of tense expectation for the fascinating process which ought to unroll itself, as if I were not the responsible person who on the other hand was standing here and had to make the speech. I had neither anxiety nor loss of sequence; only after a suitable stop there was a disproportionately long pause so that one who saw me standing there with a somewhat distant and preoccupied look hardly knew what to think of me. It was only my own long silence and the complete stillness around me which reminded me that it was my business not to listen but to speak, and immediately I continued the speech. . . . ."

Wagner gives the following two minor sensory experiences which are of some interest. He states that the after effect of the discharge of guns and cannons during the revolution in Dresden continued to affect him for some time, especially in a half awake condition. He also refers to an experience on a journey to Paris in 1849 at the age of 36 when " the monotonous sound of the quickly rolling wheels of the post-chaise on the road fascinated me and during the whole journey I thought I heard in this noise the melody of ' Freude schoener Goetterfunken ' out of the Ninth Symphony as if executed by deep bass instruments."

ROBERT SCHUMANN.*

From the life of Schumann one may choose, as in the case of Wagner, a few fragments to illustrate certain psychological problems. While Wagner concealed his intraverted disposition beneath his riotous extroverted activity, Schumann showed " a profound change in disposition between the ages of 14 and 16; at first joyous,

* La Vie Douloureuse de Schumann par Victor Basch. Paris, Felix Alcan, 1928.

frank and open, he becomes melancholy, taciturn and shut-in *in sich hinein*. He appears indifferent, inattentive, indolent and of a strange exterior passivity. He abandoned himself to mystic reveries which he loved to express in the evening in piano improvisations which elicited sobs from himself."

Schumann's father was of an ardent, enthusiastic and artistic temperament, of sensitive, emotional disposition; in his youth he was so much carried away by Milton and Young (of "Night Thoughts") that he often felt himself on the border of insanity.

The composer's mother was of practical disposition, brought up in a narrow, bourgeois environment. She put obstacles in the way of Robert taking up his musical studies and insisted that at the same time he should study law. Grillparzer, apropos of Schumann, has written "I have always thought that an artist who becomes insane has been obliged to struggle against his intimate nature."

From adolescence one has evidence of Schumann's instability of mood and of his indulgence in depressive ruminations, perhaps partly due to imitation of the sentimental heroes of Jean-Paul Richter.

As a student he writes of not liking to walk in the streets, of being nauseated at seeing stupid people, and at the age of 23 he has an attack of depression of which later he writes an account to his fiancée. In this attack there came to him suddenly one night "the most atrocious thought that a man can conceive, the thought that I was losing my reason." This thought pursued him everywhere. His breath would almost leave him. He talked of suicide. "Thanks to the work which I imposed upon myself, by a violent effort of will, life returned little by little." After this attack there was left a fear of high places and of sharp knives.

Wagner's not unpleasant experience in the post-chaise on the road to Paris was a type of experience which in the case of Schumann was accompanied by considerable distress. In the spring of 1846, at the age of 36, we learn from his wife's diary that Robert has "an excessive excitability of the auditory nerve which obliges him to convert every noise into musical sounds." In 1851 during a period of nervous disorder he has again "strange affections of the ear."

In 1853 the final psychosis had declared itself in unmistakable form. He talked of secret ink, of turning tables and of the evo-

cation of spirits. His speech was slow, heavy and difficult. He notes in his diary, February 11, 1853, " violent and painful affection of hearing." Clara wrote of these same symptoms : " During the night of Friday Robert suffered so much from an affection of the ear that he did not close an eye during the night. He heard continually one single and the same sound." In the following days the music which obsessed him and which he could not avoid hearing became marvellously beautiful. Clara writes on February 12 : " My poor Robert suffers atrociously, every noise sounds to him like music. He says it is a music so splendid with instruments of a marvelous sound such as one never hears the like of on earth. But that fatigues him extremely." A few nights later he complained of hearing complete orchestral pieces.

One night he rose and wrote down a theme which the angels had dictated to him. He lay down again and talked of the angels surrounding him and making sublime revelations, all in wonderful music. In the morning the voices of the angels changed into voices of demons, accompanied by a horrible music. Later he heard friendly voices which gave him courage. In the middle of such experiences he wrote variations on a theme which are of high artistic value.

A few days later he demanded to go to an asylum, as he could not be responsible for what he did. He died in the asylum July 23, 1856, at the age of 46.

FRANZ LISZT.*

Franz Liszt was a musician of less somber mood and of less tragic destiny than Robert Schumann but he, too, went through periods of conflict which sorely tried his sensitive nature.

At the age of 12, Liszt, although refused entrance to the Conservatory under Cherubini, made a great success at Paris as an infant prodigy and became quite fashionable. At 14, his opera Don Sancha was given at the Grand Opera in Paris.

After this period of great activity and success there was a period of exhaustion, a craving for solitude and for reading. He felt that he had a mission, while the public seemed to think that the virtuoso

* La Vie de Franz Liszt. par Guy de Portalès. Librairie Gallinard, Paris, 1927.

was merely for amusement. He had a religious devotion for his art, while around him he saw how commercial art could be. It was only in the church that he found an atmosphere similar to his exalted devotion to his art. He felt a desire to enter into orders. He plunged into religious reading. He spent much time in church, resting long on his knees. He fasted several times each week. He even had hallucinations. He saw his patron saint, St. François de Paule, stand on the waves of the sea, his mantle stretched at his feet, holding in one hand a burning torch while the other hand appeased the storm or blessed mariners.

One afternoon he lost consciousness and was found on the floor of the drawing-room beside the piano. He was accordingly sent to the seaside for treatment.

In 1827, barely 16 years of age, Liszt was already a fashionable piano-teacher in Paris. He fell in love with a music pupil, the daughter of a French count. One day, without any warning, the count informed him that his daughter would marry another, and dismissed the music teacher with thanks. That night Liszt went to his confessor, the Abbé Bardin, and renewed his earlier appeal to be allowed to take holy orders. The Abbé, too good a connoisseur of music to favor such a project, felt that Liszt would find a more suitable consolation in his art than in the priesthood. During the following days Liszt found that his sweetheart had fallen dangerously ill. On her recovery he learned that she was about to take the veil.

During this period he remained inconsolable, became progressively thinner, was so weak that he had to give up his pupils and take to bed where he passed several weeks with the blinds closed. One hardly got a word out of him and the physician lost hope of curing his languor. This lasted more that 18 months and the rumor of his death went round. L'Étoile printed an obituary. A devoted musician friend, of deeply religious belief, at last succeeded in interesting him in going over a piece of music (The Invitation to the Waltz). The prostration of the patient gradually disappeared. He now devoted himself to religious observances of the strictest type. He began to teach again and to read with avidity. There was a feeling of revolution in the air and on July 28, 1831, the Republicans were in command of the Town Hall and the sound

of cannon was heard. Transported with enthusiasm Liszt sat down to the piano in a fury of improvisation and tossed off the sketch of a Revolutionary Symphony which he dedicated to Lafayette. His mother said " it is the cannon which cured him."

The romantic stupor of Liszt finds its close analogue in a less prolonged experience of one of Rousseau's friends.

In the Confessions of Rousseau * we read the following interesting account of a stupor and it is of value to the psychiatrist in discussing the general problem of the stupors to keep in mind benign reactions of this type:

The Abbé Raynal is certainly a warm friend. I had the proof of that almost about the time of which I am speaking in his behaviour towards G. with whom he was very intimate. G., after having been very friendly with Mlle. F., suddenly took it into his head to become madly in love with her and to wish to replace C...c The lady, who is rather proud of her fidelity, dismissed this new suitor. He took the affair seriously and thought fit to wish to die from it. He fell quite suddenly into the strangest malady that one has perhaps ever heard talk of. He passed his days and nights in a continual lethargy, his eyes wide open, his pulse beating strongly, but without speaking. without eating, without budging, appearing sometimes to hear but never answering, not even by means of signs, and for the rest, without agitation, without pain, without fever and resting there as if he had been dead. The Abbé Raynal and I, we shared watch over him. The Abbé, who was stronger and healthier, passed the nights with him, I passed the days, without both of us ever being absent at the same time, and one never left before the other had arrived. The Count of F., in his alarm, brought Senac who, after having examined him said that it would not be anything and prescribed nothing. My alarm for my friend made me observe with care the countenance of the doctor, and I saw him smile as he left the room. Nevertheless, the patient remained several days immobile, without taking even bouillon or anything at all except some preserved cherries which I put from time to time on his tongue and which he swallowed very well. One fine morning he rose, dressed himself and resumed his ordinary course of life without ever speaking either to me or to the Abbé Raynal or to anybody else about this singular lethargy nor of the attention which we had given him so long as it had lasted.

JOHN STUART MILL.†

The life of the intellectual John Stuart Mill is in striking contrast with that of the romantics to whose lives we have just referred.

* Les Confessions de J. J. Rousseau. Livre VIII.

† Autobiography by John Stuart Mill. N. Y., Henry Holt and Company, 1874.

Like Minerva who sprang fully armed from the head of Jove, John Stuart Mill was apparently the offspring of the pure intellect of his father. " I was born in London, on the 20th of May, 1806, and was the eldest son of James Mill, the author of The History of British India." The second-hand copy of the autobiography from which I quote has written across page 184 an infuriated note, " He never once mentions his mother."

He began to read Greek at three and had read an appalling amount of Latin and Greek by the time he was 12. His training was altogether intellectual. He had little contact with boys of his own age. " The education which my father gave me was in itself much more fitted for training me to know than to do." His father " was earnestly bent upon my escaping not only the corrupt influences which boys exercise over boys but the contagion of vulgar modes of thought and feeling ; and for this he was willing that I should pay the price of inferiority in the accomplishments which schoolboys in all countries chiefly cultivate."

The influence of his father was very deeply stamped on John Stuart Mill and throughout his life he hesitated to express fully and decisively opinions which conflicted with those of his father. From the age of 15 Mill's ambition was to be a reformer of the world and he identified his own happiness with this object. He, therefore, felt that his happiness was assured as progress would always be made in the direction aimed at. At the age of 20 his pleasant existence was suddenly interrupted. He fell into a " dull state of nerves," he was " unsusceptible to enjoyment or pleasurable excitement." He felt that even though all reforms could be carried out immediately he would derive no happiness. The foundation on which his life was constructed fell down. For some months the clouds seemed to grow thicker and thicker. He read his favorite books without feeling. He confided his state to no one and there seemed nothing in it to attract sympathy. " My father, to whom it would have been natural to me to have recourse in any practical difficulties, was the last person to whom, in such a case as this, I looked for help." " The fountains of vanity and ambition seemed to have dried up within me as completely as those of benevolence."

Throughout this period he was able to carry on mechanically his usual routine and even made speeches at a debating society.

"I felt that I could not possibly bear this condition more than a year. When, however, not more than half that duration of time had elapsed, a small ray of light broke in upon my gloom. I was reading, accidentally, Marmontel's "Memoires" and came to the passage which relates his father's death, the distressing position of the family, and the sudden inspiration by which he, then a mere boy, felt and made them feel that he would be everything to them— he would supply the place of all that they had lost. A vivid conception of the scene and its feelings came over me, and I was moved to tears. From this moment my burden grew lighter. The oppression of the thought that all feeling was dead within me, was gone. I was no longer hopeless." The cloud gradually drew off and he again enjoyed life. Although he had several relapses some of which lasted many months he never again was as miserable as he had been.

The fact that the first gleam of sunshine in his depression came from reading about the death of someone's father is extremely significant.

As to the influence which the elder Mill throughout his life exercised upon John Stuart Mill, the following extracts from the Autobiography give us insight. When editor of the new London and Westminster *Review,* for which his father wrote, "I could not exercise editorial control over his articles, and I was sometimes obliged to sacrifice to him portions of my own." His father's death had compensations: "Deprived of my father's aid, I was also exempted from the restraints and reticences by which that aid had been purchased. I did not feel that there was any other radical writer or politician to whom I was bound to defer, further than consisted with my own opinions."

GÉRARD DE NERVAL.*

Bizet's biography is a charming study of an exalted romantic of most delicate and appealing type.

Gérard lost his mother in infancy, spent his first few years in the country with his grandparents, but after the age of eight was brought up by his father, an old army officer in the Grand Army; no doubt his childhood imagination was nourished with stories of

* La Double vie de Gérard de Nerval. René Bizet. Paris, Librairie Plon, 1928. I present Bizet's conception of the poet as presented in this book.

56

the Grand Army. In the holidays we have reason to surmise that he gave a juvenile adoration to the chatelaine of the neighboring estate who mixed in the games of the peasants and danced with them in the moonlight. For Bizet it is she who is the prototype of Adrienne and Sylvie, the two halves of a single love. She is the princess who floats through his dreams.

At the age of 18 Gérard published his first work, a small volume of poems. In the following year appeared part of his translation of Faust. Until the age of 26 he lived at home. He lived a romantic inner life, haunted by some ideal, detached from ordinary reality. He was devoted to a small group of friends who lived in a ferment of philosophical and religious aspirations and who appreciated him keenly and did not take his whimsical eccentricities too seriously. He would read very late and for a reading light would balance on his head a large copper candle holder. Occasionally he became somnolent and the light fell, with considerable danger of setting the house on fire. One evening he brought to the cafe a skull taken from his father's collection so that the group might drink from it as from a loving cup.

He translated various German poets, was much influenced by the phantasies of Hoffmann, read books on occultism, steeped himself in German poetry and in the phantoms of the north, but retained his critical spirit and wrote comedy which bore the imprint of the style of Molière.

His inner life is not easy to trace as he drifted in and out of his comrades' range of vision in a quite erratic way and apparently spent hours wandering through the streets of Paris, his mind full of romantic ideas and of poems in the making.

Until the age of 26 we hear of no special interest in women. He then became infatuated with a Jenny Colon, a comedienne, who seems to have occupied his phantasy to a large extent, but we have no evidence that his passion was anything more than an ideal one. " My ideas are singular, my passion surrounds itself with much poetry and originality. I am glad to arrange my life like a romance." In his romantic writings she enters into all the women of his productions and her image becomes associated with souvenirs of his occult readings in Swedenborg and Mesmer, and blends with his early catholic beliefs and with suggestions derived from his

study of Faust, and this image gives a particular note to his poetry and to his romantic outpourings.

Bizet considers that Charlie Chaplin might be capable of expressing in a film the extravagant mind of the poet. Charlie Chaplin would be capable of walking as Gérard did, with a lobster at the end of a blue ribbon in the garden of the Palais Royal. Gérard stated that a lobster was entitled to as much sympathy and care as a little dog, and he felt that he could not give his beloved a gift more beautiful than that. Bizet sees a certain kinship between the extravagances of the poet and those of Charlie Chaplin. The poet may not have the humor of the comedian.

From the age of 28 to 33 Gérard spent part of each year in travelling in Europe. He was apparently in a condition of sentimental agitation, preoccupied with the haunting images derived from many sources. At 32 he had much knowledge of life and a great addiction to dreams and saw very little of his friends. When he wished to leave the boredom of everyday life he could take the path to his intoxicating land of dreams. While others took refuge from boredom in opium or alcohol, Gérard resorted to his imagination to get free from his earthly chains, at first in company with other romantics such as Goethe and Hoffmann but finally under the guidance of his own unaided imagination.

At the age of 32 he spent several months in a sanitarium (February to November, 1841). To his biographer Bizet, Gérard is not insane. " Dr. Blanche at Montmartre or at Passy has treated his insanity, but his sojourns in the sanitarium of the alienist appear to me like voyages. He is in the ' Hotel of the Imaginative.' He is there just as later, after his stay in the sanitarium, he will be at Cairo or at Constantinople. He will make the same type of observation, paint wonderful landscapes, personalities, and will write in his book Aurelia a wonderful report on the Land of Dreams."

None of his friends considered him insane. He is a great imaginative in search of himself and of his God but showing little evidence of turmoil. One reads with pleasure his account of his voyages into the land of dreams. He is a very erudite guide. From an early age intrigued by the romantic stories of his father and the old sergeant, in later life perhaps he travelled in order to see whether the dreams of his adolescence based on these early stories

were true. While we are apt to travel to see what is new and to get away from the old, Gérard travelled to see if he could find again that which previously existed in his imagination (Bizet).

Towards the end of his life he found it difficult to face his thoughts. He wandered around the streets of Paris dreaming, composing. On the day before his death he visited a friend but he would not accept more than seven sous as he wanted to use a reading room. He was found hanging from the grill of a sordid night lodging house early on the following morning. He was 47 years of age.

JEAN-ARTHUR RIMBAUD.*

The life of Rimbaud is as restless and unsettled as that of Gérard de Nerval, but in it one sees a vigorous and aggressive and diabolic note which is lacking in the former.

Jean-Arthur Rimbaud was born at Charleville in the Ardennes October 20, 1854. His father was a somewhat gay soldier who had lived a rather intemperate life and finally was separated from his wife. The mother of the poet was a robust, vigorous and obdurate woman who admitted no discussion; she was of an extremely thrifty and niggardly disposition.

At an early age he showed literary talent, and in a school note-book written at the age of eight one finds a note in which he shows his appreciation of the beauty of nature while at the same time he rails at the studies of the schoolroom. He was an excellent scholar.

He was at first a docile and religious child. One Sunday when some of the schoolboys were trifling with the holy water font he was infuriated at their sacrilegious behavior and made a violent attack upon the group. The other schoolboys called him a dirty little prig. About the age of 12 his devoutness seems to have disappeared.

Throughout his boyhood he had continual friction with his mother. His reactions were somewhat extreme. When his mother refused to give him a piano he sawed the dining-room table into the form of a piano.

He wrote Latin verses with facility, worked industriously, was at the same time a credit and a source of disturbance at his school.

*La Vie Aventureuse de Jean-Arthur Rimbaud. Jean-Marie Carré. Paris, Librairie Plon, 1926.

When he was 15 a young teacher, Izambard, came to the school and by his conversation and books did much to stimulate the boy. He found him " a true intellectual, vibrating with lyric passion." The mother was furious because he introduced her boy to the writings of Victor Hugo whose name was on the index.

Rimbaud was now writing verses. At the age of 15 he demanded that man should free himself from Christianity and return to nature. He became Bohemian, emancipated himself from the restrictions of the ordinary conventions, in conversation took pleasure in being obscene, offensive, cynical.

At the end of his last year at school at the age of 15 (1870) he received prizes for a Latin discourse, a French oration and other subjects.

On August 29, without any warning, he disappeared and took the train for Paris and this was the first of a number of disappearances from home. In 1871 on his return to Charleville he wrote a series of bitter poems railing against the authorities, the government, woman. He was irritable, offended his acquaintances by his grossness and his bravado, went about with soiled garments, his long hair hanging over his shoulders. He wrote with chalk on the public benches and on the doors of churches " Death to God! " He could neither adapt himself to his society, to religion nor to literary standards. He was the prophet ahead of his age and he outlined his conception of a new poetry.

In August, 1871, he wrote his well-known poem " Bateau ivre." This poem illustrates the way in which he broke with conventional forms, and the original use of language in this poem is astounding in a schoolboy of 16. At this time he wrote to Verlaine, sending a copy of his poem, and was invited to come to Paris. Verlaine was astonished to meet this tall and hirsute schoolboy of rustic appearance. Rimbaud was disagreeably impressed with the commonplace atmosphere of the family circle of Verlaine, with his wife and her parents. He took his food and said nothing. His behavior was insolent, obstinate, unsocial. As the days went on he dragged Verlaine around the various cafes and they returned intoxicated. For two weeks Rimbaud disappeared and was found in an extremely disheveled condition. A friend gave him a room, and Rimbaud, whose clothing was verminous, stripped himself

completely and coming quite naked to the window, to the scandal of the neighbors, he threw a packet of his clothes into the street.

With Verlaine Rimbaud was a sparkling companion of great intelligence and original vision. In the company of other friends he was extremely gruff, disagreeable, disappointing. At one dinner with four comrades he was extremely provocative and finally seized a dessert knife to attack his host. He drank alcohol and haschisch. After another scene in which he attacked a fellow guest he disappeared from Paris in April, 1872. By this time Rimbaud had become conscious of his individuality and his lack of adaptation even to the demands of the artistic set.

On his return to Charleville at the age of 17 he roamed about the environment and ruminated over the technique of the poetic art. He wrote " I invented the color of the vowels! A black, E white, I red, O blue, U green. I regulated the form and movement of each consonant and with instinctive rhythms I flattered myself that I had invented a poetic word which was accessible now or later to all the senses." He was an adventurer in the realm of the poetic art, he strained towards originality.

During the following years his life was intimately associated with that of Verlaine. Verlaine was weak, sensual, sentimental. Rimbaud with his oval face " like an angel in exile " had indomitable energy and great intelligence. Verlaine left his wife to go with Rimbaud to Belgium and later to London, where they gained their livelihood with difficulty and where they had apparently bitter altercations with each other. In the following year at Brussels Verlaine, about to be deserted by Rimbaud, wounded the latter with a pistol (July, 1873).

Rimbaud now returned to his family who were living in a quiet hamlet and there he wrote a strange psychological autobiography " Une Saison en Enfer," which has been differently interpreted as an acceptance of Christianity and an assertion of paganism. It was published in October, 1873, but in November he burned practically the whole of the edition.

The psychiatrist who had been invited at this stage to give a prognosis with regard to the later life of this tempestuous individual might well have looked forward with misgivings to the later evolution of still more serious manifestations of mental turmoil. The literary prophet might have forecast mature works of great

power. As a matter of fact, this was the end of his literary career.
From this time he wrote no more poetry.

From the age of 19 to his death at 37 we find the restless explo-
ration of the real world instead of the ideal world. We find him
travelling to and fro in Europe, taking up the study of languages,
Spanish, Arabic, Italian, modern Greek, Dutch, Hindustani. From
1875 to 1880 he travelled about with the East especially attracting
him. In 1876 he became a volunteer in the Dutch army, landed at
Java, deserted, returned to Europe, was at home December 31,
1876. In 1877 he tried to get to Asia Minor but was expelled from
Vienna. Later he was in Holland, became the interpreter of a
circus, travelled through Denmark and Sweden. In August, 1880,
he arrived at Aden, was employed by a coffee merchant and sent
to Harrar in Abyssinia which he reached after 20 days of travel
through the Somali Desert.

We now find him as a merchant familiar with the native dialect,
writing home for books on meteorology and hydraulics, on car-
pentry and tanning, exploring, and during the next ten years, 1880
to 1890, sending to the Société de Géographie reports of his ad-
venturous explorations in the country of the Somali and the Gallas.
He was the first European to penetrate the Plateau of Bubassa.
On the bankruptcy of his employer he made for Aden with 40,000
francs of gold in his belt. Later on he organized a caravan to take
rifles to Menelik, king of Choa. When he reached Menelik he
found that the latter had taken possession of Harrar but was not
inclined to pay the adventurer for his rifles. The present line of
penetration into Abyssinia from the Somali coast follows the route
which Rimbaud was the first to establish.

At Harrar this ex-poet, who had invented the color of the vowels,
settled down as a business man, wrote letters to the Parisian news-
papers, offered himself as war correspondent to the *Temps* in the
Italian-Abyssinian War. Having saved 80,000 francs he was
looking forward to a visit to the Universal Exposition at Paris,
considered marrying, and wrote to his mother inquiring about
matrimonial prospects.

In February, 1891, he had the first indication of the painful
disease from which he finally died, a malignant disease of the bones.

With great pain he managed to get to the coast and returned to France to die in a hospital at Marseilles, after receiving absolution and reconciling himself with the church. He died at the age of 37.

JEAN-FRANCOIS RAVAILLAC.*

The story of the tortured soul of Ravaillac, the man who assassinated Henri IV, as given us by the Tharauds, is as fascinating as the evolution of a Greek tragedy. In this study one sees how the son of a drunken father, brought up in a home of sordid poverty, breathing an atmosphere of intense bigotry, ruminates over his destiny, and incubates with many doubts and hesitations the plan to murder the king. He seems to hear the divine condemnation of the king and feels that he has been chosen by God to be the instrument of wrath.

The presentation by the authors of the interplay of motives is all the more valuable on account of its being based on the reports of the legal process which followed the assassination.

In the report of the trial the whole soul of Ravaillac is there. It is Ravaillac himself " whom one hears talk and who in his answers reveals his torment and his secret."

* La Tragédie de Revaillac. Jerome et Jean Tharaud. Paris, Librairie Plon, 1922.

Notes and Comment.

THE SUGGESTED AMERICAN BOARD OF EXAMINERS IN PSY-CHIATRY.—Dr. Adolf Meyer in his address as President of The American Psychiatric Association, at the annual meeting in Minneapolis in 1928, called attention to the desirability of some diploma, certificate or title, bestowed by a competent authority, which should distinguish the " approved " psychiatrist.

At the meeting of the Association in 1929 in Atlanta, Ga., the excellent report made by Dr. Strecker as Chairman of the Committee on Medical Services took for its major theme " an attempt to define, or at least prepare the way for a definition of the qualifications, limitations and experience which ought to be considered necessary before a practitioner of medicine deserves to be seriously regarded as a psychiatrist."

This report, which appears on page 417, THE AMERICAN JOURNAL OF PSYCHIATRY, September, 1929, may, in view of the probable discussion of the topic at the meeting in Toronto in June of this year, be studied with profit.

Growing out of this report, upon motion of Dr. Meyer a committee of three was appointed by the President to work out plans outlined in the report.

President Orton appointed as this committee, Dr. Adolf Meyer, Dr. George H. Kirby and Dr. Edward A. Strecker. A tentative report of this committee was made in 1930 at the meeting in Washington (see page 327, AMERICAN JOURNAL OF PSYCHIATRY, September, 1930), and, as will be seen from what follows, a more formal and definite report may be expected at the meeting in Toronto in June.

In view of the importance of the subject it has been felt by the committee that an outline of what may be laid before the next annual meeting should be published, and Dr. Franklin G. Ebaugh, of Denver, Colo., has been requested to prepare such an outline for the JOURNAL. This outline follows and should be carefully stud-

ied by the members of the Association, that they may be prepared to act intelligently upon the matter:

For a long time it has been felt by many members of The American Psychiatric Association that there was a great need of establishing adequate standards upon which to base recognition of special training in the field of psychiatry. The fulfillment of this need has been attempted in some universities by the granting of degrees in psychiatry. This method is a variable one and a lack of uniformity and an inadequacy of standards may develop. Attention has been given this matter recently in Canada by the creation of a Royal College of Physicians and Surgeons, and for years the granting of diplomas in psychological medicine and mental deficiency has proven satisfactory abroad. The latest developments in the field of psychiatry indicate clearly the desirability of an American Board of Psychiatry to grant certificates, following examinations, to physicians choosing this speciality. The success of the American Board of Ophthalmology which was organized in 1917, and the American Board of Otolaryngology, which was organized in 1925, and the present organization of the American Board of Gynecology encourages the belief that our speciality could perfect a similar organization. Among members of The American Psychiatric Association there is not a unanimity of opinion regarding the establishment of a board separate from neurology. We believe, however, that a separate board of psychiatry is clearly indicated, especially if it is proposed to follow through the extra-hospital developments in our field. It is believed that the demarcation between the fields of psychiatry and of neurology has not been adequately made heretofore in America. The neurologist continues to accept in his field the important psycho-neurotic reactions and many other fundamental psychiatric problems. Merely from the standpoint of medicine generally the neurologist will always need his share of familiarity with psychiatry, just as the psychiatrist has to be familiar with, and well trained in, the fundamentals of organic neurology. Individuals who desire to train themselves to specialize in both fields could be certified also by the neurologists if neurologists so desire.

Perhaps a leading indication for certification through a board of psychiatry is the need of formal recognition for the group of men who are now completing fellowships in psychiatry in the various institutes and hospitals. Some of these men have already expressed a desire for such recognition which would be of the greatest personal value to them in adding to their feeling of security and satisfaction following the completion of examinations at the termination of their period of training.

In December, 1930, a group of psychiatrists met in New York at the invitation of the Commonwealth Fund, through Mr. Barry C. Smith, to consider various phases pertaining to the teaching of psychiatry and the training of younger physicians entering this field. After discussion it was the unanimous opinion of those present that a board of psychiatry should be organized:

To establish standards of fitness for entering the field of psychiatry.

To arrange and conduct examinations of those who desire to practice psychiatry, a certificate being conferred upon those who met the required standards.

To investigate and prepare a list of medical schools, hospitals and instructors recognized as competent to give the required training in psychiatry.

It was suggested at this meeting that proper arrangements be made to organize an American Board of Psychiatry of five members to be chosen from the membership of The American Psychiatric Association, which includes practically all those working in the many fields of psychiatric practice. These appointments to the proposed board should come from recommendations of the members of the Association, duly submitted to the council for action.

Examinations should be designed to test the physician's fitness to enter the field of psychiatry. In determining the question of certification the examiners may decide to rely on the following criteria:

First. The applicant's professional record.

Second. Contributions to the psychiatric literature made by the applicant or written report of a prescribed number of cases that he has observed and treated.

Third. A practical, clinical and laboratory examination may be required in such form as may be determined.

Applicants for certification by the board might be divided into two classes:

Class I. Those who have practiced psychiatry ten years or more.

Class II. Those who have practiced psychiatry from three to ten years; at least three years of acceptable training or experience to constitute a minimum requirement.

The following general requirements should be demanded by the board:

First. For both classes, high ethical and medical standing and also a medical degree satisfactory to the board.

Second. Formal application on an official blank with three letters of endorsement by well-known psychiatrists.

Third. Case histories, if requested. This requirement to be left to the judgment of the board.

The fee for the examination should be $25.00 at least, the same to accompany the application blank. No application will be expected to receive consideration until the fee is received. This fee is not returnable. In case of failure, however, the applicant will be admitted to a second examination which may be held after one year and not later than three years following the original examination.

The examiners will attempt to appraise the physician's educational opportunities, both medical and pre-medical, as well as his psychiatric experience; the character of the men under whom he has worked, hospital appointments, private assistantships, laboratory work, clinics visited, research accomplished, teaching, contributions to the literature of psychiatry, membership in medical societies, and his local and general reputation.

There should be a prescribed number of cases illustrating the major psychoses, the psychoneuroses and child guidance problems. Complete case reports with abstracts and formulations, clearly indicating treatment aspects,

progress, course, may be required. These case reports should be typewritten and sent to the secretary of the proposed board at a definitely prescribed time prior to the examination.

It will be expected that each candidate should be competent to interpret and if possible to conduct the following laboratory examinations: Urinalysis; blood examination, (a) complete counts and differential, (b) Wassermann reaction, (c) bromide test; spinal fluid examinations, (a) cell count, (b) chemistry, (c) colloidal gold, (d) Wassermann reaction, (e) bromide test.

Normal and abnormal anatomy and histology of the nervous system.

The examination should cover the individual study and management of psychoses and psychoneuroses and the organic neurological processes encountered in the field of psychiatry; general methods of examination, fundamental psychiatric technique and therapeutic and psychotherapeutic methods and the practice in child guidance work.

A written examination should cover the underlying principles of psychiatry which cannot be covered by the practical examinations. It will include questions pertaining to psycho-biology, including psycho-biologic concepts and principles, mental mechanisms, principles of psychiatric management of patients in the hospital and in the community, and psycho-therapeutic issues. Likewise, the written examination should aim to cover pre-medical requisites, including psychology, appropriate knowledge of the anatomy, embryology, physiology and pathology related to the central nervous system.

One of the basic aims of the proposed board should be to improve the teaching of psychiatry. These preliminary suggestions are submitted for publication in order that members of The American Psychiatric Association may consider the proposition, in advance of the formal report and the reports of other committees having more or less relation to the subject, to be submitted at the meeting in Toronto.

Appreciation is gratefully expressed to Dr. Adolf Meyer, Dr. Edward N. Brush and many others for help and advice used in the preparation of this preliminary outline.

FRANKLIN G. EBAUGH.

Association and Hospital Notes and News.

EIGHTY-SEVENTH ANNUAL MEETING OF THE AMERICAN PSY-
CHIATRIC ASSOCIATION.—The Association meeting this year will
be held in Toronto, Canada, June 1 to 5 inclusive, with head-
quarters at the Hotel Royal York, where 300 rooms will be made
available for the accommodation of members of the Association.
Information, including rates, for this hotel and others in Toronto
is being sent to each member of the Association by the Toronto
Convention Bureau. Members are advised to make their hotel
reservations at an early date.

The Railroad Associations of the United States and Canada
have agreed to allow one and one-half round trip railroad fare
rates to those who attend the meetings, provided there is a total
of not less than 150 members purchasing railroad tickets. To
secure reduced rate, members of the Association, when purchasing
tickets to Toronto for themselves and members of their families,
should state that they are attending the meeting of The American
Psychiatric Association and should, without fail, obtain a *certificate*
(not a receipt) for each ticket. Such certificates must be presented
at the headquarters registration desk for counter signature by the
Secretary and validation by the railroad representative. Tickets
for return by the same route may then be purchased at one-half
fare rate. *One-way tickets to Toronto, and NOT round trip tickets,*
should be purchased at the starting point.

The Committee on Arrangements has made special provision for
entertainment of members of the Association and their guests. The
private golf course of the Royal York Hotel will be open to guests
of the hotel and it is expected that the courtesy of other golf clubs
will be extended to Association members.

Ladies attending the convention will be assisted by ladies of
Toronto on Tuesday, June 2, on shopping tours of the shopping
district. On Tuesday afternoon there will be a cruise over Toronto
Bay as the guest of General Langdon of the Harbor Commission.
On Wednesday afternoon the ladies and members of the Asso-

ciation are invited to a tea at the country house of Lady Eaton. Motor and boat tours from Toronto will be arranged for members who wish to make such trips.

PROGRAM.

MONDAY, JUNE 1.

Morning and afternoon sessions of the Section on Convulsive Disorders.

TUESDAY MORNING, JUNE 2.

Opening session. Organization, invocation and addresses of welcome.
Announcements:
    Committee on Program, Arrangements, and Publicity.
Reports:
    Council.
    Secretary-Treasurer.
    Editor of AMERICAN JOURNAL OF PSYCHIATRY.
Appointment of Committees on Nominations and on Resolutions.
Memorial for Deceased Members.
President's Address.

TUESDAY AFTERNOON, JUNE 2.

Scientific Program: General Topic, "The Relationships of Psychiatry."

TUESDAY EVENING, JUNE 2.

Round Table Discussions.

WEDNESDAY MORNING, JUNE 3.

Report of Council.
Election of Members.
Unfinished Business.
Reports of Auditors.
Report of Nominating Committee.
Election of Officers.
New Business.
Scientific Program: General Topic: Schizophrenia.

WEDNESDAY AFTERNOON, JUNE 3.

Continuation of Scientific Program.
Reception and Tea at home of Lady Eaton.

WEDNESDAY EVENING, JUNE 3.

Annual Address.
President's Reception.

THURSDAY MORNING, JUNE 4.

Report of Council, including time and place of next meeting.
Scientific Program: Miscellaneous topics.

THURSDAY AFTERNOON, JUNE 4.

Scientific Program, continued.

FRIDAY MORNING, JUNE 5.

Scientific Program: Joint Session with the American Psycho-Analytic
    Society.
Report of Committee on Resolutions.
Introduction of President-elect.
Adjournment.

Members and guests of the Association are invited by Dr. G. H. Stevenson, Superintendent of the Ontario Hospital at Whitby, to be his guests on Friday afternoon.

PRELIMINARY LIST OF READERS.

Dr. Lauretta Bender.
    (By invitation.)
Dr. Joseph R. Blalock.
    (By invitation.)
Dr. Karl M. Bowman.
Dr. Abraham A. Brill.
Dr. Sanger Brown II.
Dr. Eric Kent Clarke.
Dr. Richard Dewey.
Dr. Clifford B. Farr.
Dr. Temple Fay.
Dr. Riley H. Guthrie.
Mr. G. W. Haney, M. A.
    (By invitation.)
Dr. Anita Wilson-Harper.
    (By invitation.)
Dr. George W. Henry.
Dr. C. M. Hincks.
Dr. Leland E. Hinsie.
Rev. Reuel L. Howe.
    (By invitation.)

Dr. Gerald R. Jameison.
Dr. Foster Kennedy.
    (By invitation.)
Dr. Marion E. Kenworthy.
Dr. Henry I. Klopp.
Dr. Karl H. Langenstrass.
    (By invitation.)
Dr. John A. Larson.
Dr. Nolan D. C. Lewis.
Dr. David Levy.
Dr. K. Lowenberg.
    (By invitation.)
Dr. Lawson G. Lowrey.
Dr. Clinton P. McCord.
Dr. James G. McKay.
Dr. William Malamud.
Dr. Wilbur R. Miller.
Dr. Frederick P. Moersch.
Dr. S. R. Montgomery.
    (By invitation.)

Dr. James G. Naurison.
    (By invitation.)
Dr. Clarence P. Oberndorf.
Dr. Mary O'Malley.
Dr. J. H. Pike.
    (By invitation.)
Dr. Horatio M. Pollock.
Dr. D. Rothschild.
    (By invitation.)
Dr. Paul Schilder.
    (By invitation.)
Dr. George H. Stevenson.
Dr. Harry Stack Sullivan.
Dr. Hans Syz.
Dr. Theodora Wheeler.
Dr. William A. White.
Dr. Gordon F. Willey.
Dr. S. Bernard Wortis.
    (By invitation.)
Dr. Paul I. Yakovlev.
Dr. Gregory Zilboorg.

To afford more time for presentation and discussion of the
scientific papers, the Executive Committee has voted to have the

reports of committees presented directly to the Council, rather than having them read from the floor to the Association. The Council will consider and act upon these reports and make recommendations to the Association.

INFORMATION AS TO CANADA'S RECREATIONAL RESOURCES, MOTOR TOURS, ETC.—Mr. F. C. C. Lynch, Director of The National Development Bureau, Ottawa, Canada, has kindly furnished the JOURNAL with the following announcement:

For the benefit of members and friends of The American Psychiatric Association who contemplate attending the Convention of this organization, to be held in Toronto, Canada, during the first week of June, we wish to announce that information on Canada's recreational attractions may be had without charge from the National Development Bureau, Department of the Interior, at Ottawa, Canada.

Canada, with its 75,000 miles of paved or surfaced motor roads free from congested traffic, with recreational attractions within reasonable distance of the chief centres of population, offers all that could be desired by the visitor, in the way of comfort and convenience.

The various Provinces of Canada offer a means of an enjoyable vacation amid nature's attractions. Rivers and lakes well stocked with fish, boating and bathing resorts and comfortable modern hostelries are only a few of the attractive features of each.

For the benefit of those desiring such information, the above mentioned Bureau has prepared a series of maps indicating the main connecting highways between Canada and the United States, also a number of booklets covering motoring, camping, fishing and other phases of recreation. These maps and booklets may be had without charge, upon application.

NEW RUSSIAN MILITARY-MEDICAL JOURNAL.—The first three issues of the " Military-Medical Journal "—a publication of the Military-Medical Academy in Leningrad have been received. The new Journal will serve the needs of military surgeons and physicians, publishing chiefly contributions from the Military-Medical Academy. Some space will be allotted to articles of general interest. In the first two issues there are a number of contributions dealing with laboratory-experimental and clinical problems of military-medical interest.

The only article of psychiatric nature appears in abstract in this issue.

THE DEPARTMENT OF STATE EDUCATION, UNIVERSITY OF THE STATE OF NEW YORK, APPOINTS A PSYCHIATRIST.—Dr. Frederick L. Patry has been appointed to the position of psychiatrist to the above department and assumed the duties of the position late in February, 1930.

This is a new position, but one which the department has felt the need of for some time. The object of the appointment is to utilize what psychiatric experience and training has to offer in forwarding the efforts of the department to conserve and improve the mental health of the students in the schools of the state.

Dr. Patry was on the staff of the New York State Hospital at Utica for three years, with the exception of some seven months at the Marshall Sanitarium, Troy, New York. For the past two and a half years he has been a Commonwealth Fund Fellow in Psychiatry at the Henry Phipps Psychiatric Clinic of the Johns Hopkins Hospital, Baltimore, under the direction of Dr. Adolf Meyer.

APPLICANTS FOR FELLOWSHIP OR MEMBERSHIP IN THE AMERICAN PSYCHIATRIC ASSOCIATION. (Supplemental to the list published in the January, 1931, issue.)

FOR FELLOWSHIP.

Francis J. Gerty, M. D., Chicago, Ill.

Sarah Coppinger Johnson, M. D., Franconia, N. H.

Harry B. Levey, M. D., New Orleans, La.

John Davis Reichard, M. D., Ellis Island, N. Y.

Charles Ricksher, M. D., Middletown, Conn.

Walter Schilling, M. D., San Francisco, Calif.

R. S. Wile, M. D., New York, N. Y.

Orus Ray Yoder, M. D., Kalamazoo, Mich.

FOR MEMBERSHIP.

Samuel Atkin, M. D., New York, N. Y.

Edythe A. Bacon, M. D., Hopkinsville, Ky.

William Baillie, M. D., Toronto, Ont., Canada.

Joseph R. Blalock, M. D., New York, N. Y.

G. Creswell Burns, M. D., Los Angeles, Calif.

Donald Ewen Camerson, M. D., Brandon, Man., Canada.

Alex D. Campbell, M. D., Weyburn, Sask., Canada.

Charles A. Cleland, M. D., Toronto, Ont., Canada.

Jason A. Hannah, M. D., Toronto, Ont., Canada.

Thomas J. G. Hogan, M. D., Harrison, N. Y.

Mary V. Jackson, M. D., Toronto, Ont., Canada.

Harland W. Long, M. D., Pittsburgh, Pa.

L. Cody Marsh, M. D., Kings Park, N. Y.

Clifford Douglas Moore, M. D., Waltham, Mass.

Jacob L. Moreno, M. D., New York, N. Y.

Samuel Z. Orgel, M. D., New York, N. Y.

Joseph A. Porter, M. D., Weston, W. Va.

Theodore Russell Robie, M. D., Cedar Grove, N. J.

Lawrence F. Woolley, M. D., Cleveland, Ohio.

S. Bernard Wortis, M. D., New York, N. Y.

57

Abstracts and Extracts.

A Form of Acquired Psychic Invalidism. P. B. GANNUSHKIN. (*Collected Papers, Psychiatric Clinic, First Moscow State University, Moscow, U. S. S. R., 2: 53. 1927.*)

The author describes the clinical picture found in comparatively young men between the ages of 20 and 30 and which consists essentially in marked impairment of intellect as well as some involvement of the emotional life of the patient. It does not resemble any of the functional psychoses but it has some resemblance to the psychic insufficiency found in the early stages of cerebral arteriosclerosis. In other words one gets a picture of a psychic invalidism which comes in early life and bears an imprint of organicity. The author states that this clinical picture has come to the attention of psychiatrists quite recently on account of the local conditions in Russia which have crystallized such cases.

As an etiological factor one deals with tremendous work overload and responsibility in people engaged in intellectual work which results in premature exhaustion of the whole organism and especially the brain. The situation was more complicated by the fact that quite immature individuals had to deal with tasks requiring tremendous ability and responsibility. The factors of physical and mental fatigue are in these cases closely interwoven. One is dealing with cases of immature, unprepared young men who were doing strenuous work for 14, 16 or even 18 hours a day. This went on day after day without any interruptions and vacations. The physical conditions of work and the general living conditions were on an extremely low level, with inadequate food and extremely poor housing. The only interruption in the work took place when an individual became sick or in case of women when they had delivery or abortions. As a rule, there was a return to work before convalescence took place. In the cases observed, individuals were rather unfit for intellectual work which resulted in a greater feeling of inadequacy and brought on fatigue much sooner. Combined with these factors there was a tremendous emotional factor which consisted in the feeling of responsibility, a constant fear for his own life as well as the lives of others.

The author has seen young men between the ages of 17 and 18 who, in the course of several years, have carried very important executive positions and who have done rather unusually well in spite of their youth and inexperience, invoking a great deal of admiration from their superiors. Eventually this work resulted in a complete breakdown. The author has seen young enthusiasts who have done heroic acts day after day constantly in danger of death or capture with disgrace and torture. Cases of girls are described who

at the age of 19 or 20 have already had children, have gone through terrific experiences of civil war, and who were carrying tremendous responsibilities and at the same time studying in schools. Two or three years afterwards many of these girls were found to be ill, weak, and completely loosing their vigor and originality.

In addition to the marked intellectual and physical fatigue, there were secondary etiological factors.

1. Various traumas including cerebral concussion.
2. Various infections, most frequently typhus.
3. Toxic factors, such as alcohol and cocaine.

Any one of the three above named factors can cause a marked disorganization of the psychic life; in the cases cited by the author, there was a large number of these factors present.

The clinical picture consists largely in marked reduction of efficiency. The quality and efficiency, as well as the volume of work, is impaired. Memory is not as keen as previously, the grasp of things is reduced and together with this one finds marked fatigue and irritability. One cannot speak in these cases of any personality change in the same sense as one describes it in schizophrenia. The most common clinical forms are as follows:

1. Marked irritability with explosive temper outbursts usually on the basis of a previous emotional instability or head trauma.

2. More frequently one finds periods of depression which bear the character of a reactive depression in response to definite situations which took place some time before, or

3. Various hysterical manifestations with complaints of headaches, fatigue, fainting spells, etc.

The condition develops within three or four years and leads to an irreduceable intellectual impairment. The patients who previously were able to do high grade work can now only do simple mechanical tasks. The author differentiates this syndrome from neurasthenia by the fact that a prolonged rest does not help. There are a very few points of contact with schizophrenia, and one cannot see any mechanism of a " flight into a psychosis."

The author regrets the fact that he has no pathological material to demonstrate the changes in the central nervous system. The author firmly believes that grave emotional disturbances and intellectual fatigue result in definite organic alterations in the brain.

<div style="text-align: right">J. KASANIN,
Boston Psychopathic Hospital.</div>

The Conditioned Reflexes in Children with Decreased Responses to Stimuli and Diminished Inhibitory Reactions. A. WOLOWIK. (*Medico-Biological Journal, 5:110, 1929. Moscow, U. S. S. R.*)

The work of Pavlov has shown that strong stimuli cause strong responses as well as strong inhibitory reactions. The disturbances in the delicate balance

of the two, have been described previously. In children with a predominant inhibitory mechanism, one gets hysterical manifestations, while children with dominant stimulatory responses develop reactions similar to those found in epidemic encephalitis. Children have been found who react very inadequately to very strong stimuli. Such a child was used as the subject in this experiment. He has been a patient in Krasnogorski's Clinic for several years, and was a dull, restless youngster, who previously has had a T. B. infection in bones with some sequelæ.

In using the standard technique for elicitation of the conditioned reflexes, it was found out that this child had a fundamental weakness in the development of responses to strong stimuli and also a weakness in formation of inhibitions. The stimulus in this case was cranberries accompanied with the sounds of a metronome and an electric bell.

The author comes to the conclusion that the weakness in responses, as well as formation of inhibitions, points to a fundamental weakness of the cortical processes. A weak cortex does not provide sufficient regulatory influence over processes arising in the lower centers. Special technique can increase the inhibitory reaction. The æsthenic type of salivary glands shows in hyposecretion which is not increased by administration of drugs such a pilocarpine.

<div align="right">J. KASANIN,
Boston Psychopathic Hospital.</div>

The Pathological Significance of Acroasphyxia. J. A. BEILIN. (*Medico-Biological Journal, 5:2:129, 1929. Moscow, U. S. S. R.*)

Acroasphyxia or cyanosis of the extremities and distal parts of the body such as nose, ears, etc., is found very frequently either by itself or in connection with gastro-intestinal and cardiovascular systems. Very often it is a clue to the pathological processes within the organism and probably has some relation to the vascular pathology of the brain. Ten cases are described by the author with intensive studies of the various systems of the organism. The author's conclusions are as follows:

Acroasphyxia is accompanied by disturbances of sensibility of a non-radicular type. It depends upon the disturbances of the vegetative nervous system, especially the sympathetic division and the endocrine factors. In certain stages of its development acroasphyxia can lead to complete invalidism. The acroasphyxia can be a result of various pathological processes not always clear in the various parts of the central nervous system. Temperature variations have nothing to do with the etiology of this condition. Following the diagnosis of acroasphyxia, a thorough study of all factors which may have contributed to the condition must be undertaken, only then is rational therapy possible.

<div align="right">J. KASANIN,
Boston Psychopathic Hospital.</div>

The Inheritance of Acquired Characters. PROF. G. SSACHAROFF. (*Medico-
    Biological Journal, 5: 5, 1929. Moscow, U. S. S. R.*)

In mice 5-6 weeks of age the spleen was removed and after this careful
whole and differential blood counts were made from time to time. In the
splenectomized animals leucocytosis develops which persists from 10 to
12 months. When the splenectomized animals were interbred, the F_1 genera-
tion also had a leucocytosis but less marked than the parental generation.
F_2, F_3 and F_4, on the other hand, have a leukopenia. When the spleen was
removed from both animals in the F_1 generation, the F_2 generation showed
a tremendous variation in the number and type of cells. When animals were
crossed in the F_2 generation, the F_3 generation showed a very marked
leukopenia and the animals died within a very short time.

The author interprets this result as follows:

The leucocytosis in the splenetomized animals is due to the over-com-
pensation by the hematopoetic system. The persistence of the leucocytosis
in the F_1 generation is due to the transmission of the tendency to over-
compensation. However, the fundamental reaction after the splenoctomy is
leukopenia and the F_2 generation gives the normal biological reaction. Both
the tendency to leukopenia and the tendency to over-compensation are trans-
mitted in the germ plasm with the result that the extreme reaction to over-
compensation spends itself very soon and the fundamental biological reaction
comes to the surface. The fact that, when, the mice of the F_1 generation were
splenectomized and interbred, the F_2 generation showed a much greater
leukopenia is a proof of the author's contention, as shown by the formula that
crossing *DR* with *DR,* you get mostly *DR's.* It is significant that trans-
mission of the acquired characters takes place through the mother.

<div style="text-align: right">

J. KASANIN,
Boston Psychopathic Hospital.

</div>

Prisoners and Prisons. AMOS W. BUTLER. (*Journal of Criminal Law and
    Criminology, 1929, 20, 182.*)

A detailed report of federal institutions housing prisoners, including U. S.
Penitentiary, Leavenworth, Kansas; U. S. Penitentiary, Atlanta, Georgia;
U. S. Penitentiary, McNeil Island, Washington; U. S. Reformatory, Chilli-
cothe, Ohio; The Federal Industrial Institution for Women, Alderson, West
Virginia; The National Training School for Boys, Washington, D. C.; and
the National Training School for Girls at Muirkirk. There is a discussion
concerning the population of federal prisoners in county jails, state peniten-
tiaries, etc., and the housing of the criminal insane at St. Elizabeth's Hos-
pital, Washington, D. C. The author finds two objectionable factors present
in every one of these institutions and these are overcrowding and lack of
occupation for the inmates. Many of the institutions have double or nearly
double their normal capacity. The reasons for this, according to the author,
are due to several factors. One of these factors is the large number of nar-
cotic addicts that are sent to penitentiaries under the federal law and which,

of course, should not be treated as prisoners but as patients and hospitalized. Another cause is the failure of the federal government to keep pace with the increase of population and its administrative duties in furnishing adequate housing facilities for its prisoners. A third cause is the refusal of some state penitentiaries and county jails to longer house federal prisoners as these local institutions are more and more requiring their space for their own uses. The fourth factor is the political domination of the personnel of the institutions. The primary reasons for unemployment are the opposition by industries and trades unions to competition under government supervision by prisoners and the fact that the federal government has not provided sufficient opportunities for employment either in or outside of the institutions. The author discusses at length the "lease," the "contract" and the "public account" methods of furnishing employment. He believes that the "public account" system is probably the best for the institutions and the prisoners. He compares our system with the Canadian system and reviews Dr. Liepmann's survey of the American jail. He believes that some solution to some of these problems may be found in providing shorter but surer penalties for criminal acts, the wider use of parole and indeterminate sentences and probation. He, moreover, calls attention to the general lack of available statistical material regarding crime and concludes with the following recommendations: 1. The discovery of ways of reducing the population of the federal penitentiary, especially the removal of the drug addicts to institutions where they can receive the care they need. 2. The establishment of mental hospitals for prisoners who need such care. 3. The extension of prisoners into colonies for farming, etc. 4. Increase in employment of prisoners. 5. Increase of number of parole and probation officers. 6. Provision of work house farms for the employment of prisoners now sentenced to jail. 7. The present federal penitentiaries should not be enlarged save to provide shops for the employment of prisoners. They are already larger than they should be. 8. Two new penitentiaries should be built. 9. Thorough mental and physical examinations should be made of all prisoners in all institutions for the purposes of classification, employment, education, etc., as well as for medical care. 10. The provision of institutions for short term prisoners now housed in county jails. 11. A definite penal policy should be established, organized under non-partisan prison board having entire charge and providing a constructive program according to recognized modern ideas and governed by the merit system.

EBAUGH.

The Mental-Hygiene Aspect of the Boy-Scout Movement. WILLIAM C. MENNINGER. (*Mental Hygiene, 1929, 13, 496.*)

The author states that the purpose of boy scout organization is "to promote, through organization and cooperation with other agencies, the ability of boys to do things for themselves and others, to train them in scout craft, and to teach patriotism, courage, self-reliance, and kindred virtues." He finds vari-

ous psychological factors in the boy scout movement which he considers par-
ticularly beneficial from the standpoint of mental hygiene : the first of these,
the provision in the program for an appeal to the ego and the gratification of
ego desires ; the second, the development of group consciousness ; and the
third, the direction of the boys collectively into purposeful lines of activity.
The fourth and what he considers the most powerful psychologic factor is
the ideal presented to the boy in the scout master who has himself been a
scout and is in a position to obtain and hold unstinting devotion on the part
of the boy scout. He states, however, that scout masters may fail because
of their attitude or because of their lack of awareness of the importance of
this relationship. In addition to the formal purposes of the movement, scout-
ing offers additional advantages in the development of life interests, in in-
creasing the dexterity of muscular accomplishments, in socialization of the
individual, in group enforcement of standards and in offering a leader to
be emulated by the members.

                                                          EBAUGH.

To a Graduating Class of Geniuses. EARL D. BOND. (*Mental Hygiene,
    1929, 13, 520.*)

The author states that mental patients have much to teach regarding the
normal behavior. " The things that mental patients have to teach gain value
from the psychiatrists' universal observation that the more closely the normal
and abnormal activities of human beings are studied, the more they tend to
coalesce. Explain one and you explain the other." It is not, he states, that
the psychiatrist sees so much abnormality that he thinks everyone is queer,
but rather that he sees the normal where others do not. To him normality is
a very wide road wherein there is room for the American banker and the
Mohammedan beggar. He shows a close relationship between delusions and
prejudice, with the foundation of each in unassimilated experiences of early
life. Geniuses, he believes, have prejudices against the common herd while
the common herd tends to have prejudices against them. Nevertheless,
geniuses are allowed certain privileges shared only with mental patients and
children—" to be peculiar in dress, to be open in speech, to be less ashamed
of having emotions, to be impractical." He contrasts the systematic intel-
lectual training of children with the haphazard emotional training and shows
that in the former what is once learned can as a rule be relied upon later,
but in the latter new substitutions for old attitudes are continually being made.
He does not believe that many college graduates, especially the geniuses,
would be entitled to a diploma in emotional achievement. He shows some of
the methods for attacking prejudices and delusions and the value of inter-
pretation of such life experiences. In all this exploration mental patients
are a great help; they are almost contemporary ancestors of ours; they
often get directly to a life and thought hidden from well people; they are
what we were; they can tell us how differently their minds work when they
are sick and when they are well. And psychiatrists, after analysis, after the

study of mental diseases, may make suggestions for the better guidance of everybody's education and problems, so that many can gain without paying the cost either of a struggle to get at what they do not wish to face or of mental disease.

EBAUGH.

Psychogalvanic Studies on Affective Variations in the Mentally Diseased. EDWARD M. WESTBURG. (*Arch. of Neur. and Psych., 1929, 22, 719.*)

The author applies the psychogalvanic reaction to classified cases of mental diseases (dementia præcox, manic-depressive and paresis) for the purposes of finding whether it has any diagnostic value and whether it can be used as a criterion of improvement. He finds that the various groups show no differences in resistance to the passage of a small electric current except in the case of patients with profound catatonic dementia præcox who have increased resistance; that mentally defective patients and normal subjects show relationship between resistance and magnitude of galvanic responses; that patients with catatonic dementia præcox give the smallest galvanic deflection. As a group dementia præcox patients have smaller galvanic deflections than other groups and the greater the deterioration the smaller the deflection. The manic-depressive group shows less uniformity in galvanic deflections than do the dementia præcox and normal subjects and has smaller deflections that the normal subjects. Subjects with manic-depressive psychosis and with dementia præcox who improve showed an increase in galvanic deflections. This increase in psychogalvanic deflections was noted quite uniformly in all cases that improved, including the paretics. He concludes that the psychogalvanic measurements show promise of aiding in diagnosis, suggesting methods of therapy and yielding checks on the effectiveness of therapeutic measures and may be used to indicate a few days or a week before its clinical observation that another attack of mania or depression is beginning or that improvement is taking place and whether each application of therapeutic measure is having a favorable or unfavorable effect on the patient.

EBAUGH.

Neuro-psychiatric Traumatisms among Commissioned Officers in the Red Army. ISKOV, TIEMKIN AND TIMOFEIEV. (*Military-Medical Journal of the Military-Medical Academy. State Medical Publishing, Leningrad and Moscow, Vol. 1, Part 2, Page 16, 1930.*)

The authors make an attempt to correlate the various manifestations of neuro-psychical and physical exhaustion with the divers conditions encountered in military life. This study was made on a group of 337 commissioned officers of the Red Army, and only two branches of the service, the Infantry and Artillery were considered. The group includes representatives of various races from different parts of the Soviet Republics. The Infantry comprises 51.3 per cent of the group, and Artillery 48.7 per cent. 66.7 per cent of the

group were under 30 and the rest above 30. Classified according to their social status 27.8 per cent of the Infantry belonged to the laboring class, 45.0 per cent to the peasantry, 24.8 per cent were petty employees prior to their conscription and in 2.4 per cent the status was indefinite. In the Artillery the percentages respectively were as follows: 27.6 per cent, 32.8 per cent and 29.6 per cent.

The authors present a number of other statistical data among which are membership in the communistic party, length of service, active service on the battlefields, injuries sustained during engagements and a number of other significant factors.

Of considerable interest are the statistical data concerning the civil status of the group. 79.0 per cent of the Infantry were married, 25.0 per cent divorced, 73.2 per cent had one child, 20.4 per cent had two and 6.4 per cent three children. There was no offspring in 37.5 per cent. In the Artillery the respective percentages were as follows: 73.0 per cent, 6.0 per cent, 73.0 per cent, 19.8 per cent and 7.2 per cent.

The living conditions of each individual in this group are of great significance. In the Infantry officers quarters allotted by surface area averaged 10 sq. meters in 59.8 per cent, from 10-15 in 31.5 per cent, from 16-20 in 9.3 per cent and over 20 square meters in 7.4 per cent. In the artillery the figures vary somewhat, being: 27.2 per cent, 21.4 per cent, 13.2 per cent, 38.2 per cent respectively. In 40.6 per cent in Infantry and in 59.4 per cent in Artillery the officers had no individual or separate quarters.

As regards the mental condition in the Infantry psychasthenia was present in 1.2 per cent, psychopathic personality in 1.2 per cent, cyclothymia in 3.6 per cent and organic reactions in 1.2 per cent. In the Artillery 3 per cent were of psychopathic personality, 1.2 per cent of ciclothymia and 1.8 per cent organic reactions.

Considerable attention is paid by the authors to the occurence of neurasthenia in their case groups. They consider this type of mental disorder as a "reactive asthenic state." In the Infantry the percentage of the various types of neurasthenia were as follows: 34.5 per cent of a mild and 10.5 per cent of a very severe form. In Artillery the respective figures are: 32.1 per cent and 23.6 per cent. They found the greater number of cases of neurasthenia to be among the married, especially those who were childless or had only one child.

In the majority of cases with a definite neuro-psychiatric condition the living quarters were rather deplorable. As an example an officer occupying one room only the sanitary condition of which is about 50 per cent of the norm. The severity of the mental condition apparently is in harmony with the low grade of the living standard.

They were also able to establish a direct correlation between the "reactive neuro-psychiatric traumatization" and the abnormal dietary régime, irregular meal hours and the use of intoxicants, particularly alcohol and nicotin.

                                                        J. Notkin.

Book Reviews.

Five Hundred Criminal Careers. By Sheldon Glueck and Eleanor T. Glueck. (*New York: Alfred A. Knopf, 1930.*)

This work of the gifted Glueck family is a reoprt of their study made under the Milton Fund of Harvard University into the lives of the five hundred and ten men who were released from the Massachusetts Reformatory at Concord in the years 1921 and 1922. The careers of the men are first traced to get their background. They are then watched and examined in the reformatory itself, and finally are followed out into the world after "graduation." The post graduate period is next considered, first while parole supervision is at least in theoretical effect, and then for the five years thereafter, during which there is no such supervision. Some of the problems to which the study seeks the answer are as to the nature of the boys who get into reformatories with reference to what factors in their early lives, compared to other boys, tend to lead them into trouble; how they spend their time at the reformatory and what influences work on them there; what traits, developed either before or after coming to the reformatory, seem to contribute to their success in overcoming their difficulties; and lastly to what extent the average run of inmate of such an institution receives the benefits which the name reformatory comfortably assumes. To give the answer to the last problem first, we find that, roughly, 20 per cent five years after the parole period are "successes" and that the remainder are "failures." Even the 20 per cent of success is somewhat spoiled by the reflection of the authors that the mere passage of time and maturity of the boys undoubtedly, in many cases, settles them into a more rational mode of living without benefit of reformatory.

The book is so full of statistical matter that it is difficult to compress it into a review without doing violence to the details of the picture presented, and thus one can only recommend it without reservation for careful study. The book is, among other things, a text for future investigators from the standpoint of method. One can easily imagine that an investigator approaching an ex-criminal needs great ingenuity first to find him, and boundless tact and resource to get even an interview, much less an accurate story. It is just at this point that the present study surpasses all others which have professed the same purpose; most of them have stopped short with the parole period of observation and have not even undertaken the prodigious labor of tracking down a wandering group of men whose greatest wish is to be let alone, whether they have "reformed" or whether they are still merely trying to keep ahead of the police. It is pleasing to examine the fruits of such faithful perseverance and, quite aside from the valuable information it supplies, it is sound work courageously completed. As those who are familiar with such literature are aware, the usual survey of the results of reform

schools show an exactly inverse proportion of success and failure to that
which the Gluecks have recorded. It is discouraging, but probably true, that
the thoroughness of this study accounts for the reversal of percentages.

Concord was selected because it was near at hand and because it seems
to the authors to be at least typical of the better than average reformatory.
There are better ones, but in reviewing the lives of these men one is struck
with how *much* better and how almost different in kind an institution would
have to be to effect the reorganization in individual lives which is necessary
for a thorough-going reform. In Concord a conscientious effort, for what
it is worth under the circumstances, is made to examine the inmates physi-
cally and mentally. They are sent to school and made to work at trades.
Some attempt is also made at what is optimistically called character building.
In other words, Concord is more than incarceration.

Considering first the background of the inmates, the findings show that
more than half of their immediate families had criminal records, that over
half had also been in contact with welfare agencies; surely the normal Massa-
chusetts family would not run nearly as high in either of these respects. The
fathers of the inmates were engaged in mechanical work, as distinguished
from all other occupations, in a higher percentage than is true of the general
population. One wonders if there is any significance in this fact. In the case
of only about one-eighth of the boys had either or both of their parents even
attended ordinary schools, and in 60 per cent of the cases the homes were
classified as "disrupted" or otherwise distinctly unhealthy. We also note
that the number of children in the families from which the inmates come is
larger than the average, which seems offhand to be ammunition for Mrs.
Sanger and the Gillett Birth Control Bill. So far, however, these findings
are not startling and serve merely to support the usual assumptions.

It is not so simple, however, to explain the statistics regarding the nation-
ality and birth of the boys and their parents. In the reformatory group, for
instance, there are two and a half times the proportion of boys born in the
United States of foreign parents as there are in the normal population from
the last census; whereas the foreign born boys in Concord are only 40 per
cent as many as are in the general population. The sharp variance of these
figures seems to prove beyond doubt that the slums of southeastern Europe
are not crowding our reform schools, as many Nordics would like to believe.
The ratio of native born sons of native parents is about the same in the
reformatory as outside. The authors suggest, without asserting, that the high
percentage of offenders among the native born of foreign parents arises out
of conflict between the Old World and the New when bottled up in the same
home. Probably in many such cases the boys simply leave home because
they find it uncongenial.

Continuing the analysis of the reformatory population, it was found that
95 per cent of the boys before going to the reformatory had associated with
definitely bad companions, while most of them admitted hetero-sexual experi-
ence, and more than half drank habitually and nearly half gambled habitually.
About half had never lived in one community long enough to fit into it; edu-
cation and church attendance is negligible. Their religious affiliation presents

the interesting observation that the Roman Catholics contribute their normal percentage of the general population, whereas the Protestants contribute a higher percentage, while the Jews contribute definitely less to the reformatory population than their proportion. The generally accepted fact that the Jews maintain close family relationships therefore fits in with the thesis that the absence of any home ties is one of the highest contributing factors to delinquency.

Coming next to an account of life in the reformatory we find that the average age is just over twenty years. About 80 per cent are in fair physical condition on entrance. One-third are of normal mentality, about half are dull or on the borderline, and about one-fifth are feeble-minded. This is, of course, a much poorer showing than among average school children. As to the value of the trades engaged in as part of the Concord routine, the instructors report that not more than 17 per cent had learned enough to earn a good living on the outside, either as semi-skilled or skilled workers. In theory personal supervision is given each man to encourage his personal development, but one does not have to be told that as a practical matter adequate personal contact simply cannot be established because of sheer numbers and lack of facilities. Psychiatrists have trouble enough in re-educating a few willing patients not to know that one psychiatrist among several hundred hard-boiled and smart aleck boys has very little chance of doing more than scratching the surface. What seems to be necessary is the equivalent of a second birth—something to crack open the *gestalt* and force a rearrangement. That this *can* be done by the introduction of a strong factor into the men's lives is related in a chapter devoted to a personal study of nine of the lives, who otherwise figure as mere numbers in the statistics. As in the case of so many non-criminals it is frequently a sensible and devoted woman who shatters the *gestalt*.

From the treatment of parole methods and results we are not surprised to learn that in practice parole does not furnish the supervision for which it is designed, so that in the consideration of these careers there is less practical than theoretical difference between the parole and post-parole periods of their lives on emerging from the reformatory.

The critical point of the study, however, considered in the light of an aid to the intelligence in re-conditioning nature, emerges in the discussion of the inter-relationships between post-parole criminality and other factors, and the effort to make a comparative evaluation of such other factors to serve as a means of predicting the probable incidence of future criminality before the opportunity for embarking upon such criminality has been given. In other words, from a selection of the most significant factors in future criminality a criterion is set up to guide the judge or parole board, who may be faced with the duty of dealing with a graduate of a reformatory about whom these factors are known. The possibility of establishing such a criterion is an alluring conception and seems to be at least a partial vindication of the traditional school master, who said of a certain boy that he should always be punished because if he was not in mischief, he was sure to be planning some future mischief. Space unfortunately forces us to omit a consideration of

the very many factors concerned which did not seem to the authors to be sufficiently important in their effect on post-parole criminality to be included as part of the criterion. Some of the more important early factors which do seem to affect the chance of the graduates for reform are work habits and economic reliability, age at the time of first delinquency and the seriousness of the offense, prior penal experience, physical, mental and emotional condition.

Considering next factors arising after admission to the reformatory, the following are stated to have an appreciably strong statistical bearing on the continuation of criminality: frequency and seriousness of offenses against reformatory rules and regulations, church attendance, size and congeniality of family, industrial skill, economic status and use of leisure.

Having chosen these apparently important factors, each one is then divided up from reference to the detailed statistics to express degrees of importance. Thus use of leisure is divided into bad, fair and good. These sub-divisions of factors are then given an estimated percentage value to express their probable relation to the incidence of total failure with reference to subsequent criminality. After this mathematical criterion is set up the score of any individual man can then be determined by adding up the total of the categories into which he fits in relation to each factor. When this has been computed the man in question is believed to have a chance of reform in inverse proportion to his score. The authors are sensible enough to realize that such a basis of prediction cannot be used rigidly, but must be taken subject to variations made necessary by special facts. Nevertheless some similar statistical device, if it can be confirmed in future studies of equal thoroughness, is a far more rational instrument in gauging the future of a specific prisoner than the most conscientious guess-work based on general impressions, and is infinitely preferable to the all too frequent subjective factors, which now have so much weight, such as the pre-disposition or disposition of a judge or even the current state of his digestion. The reviewer as a practicing lawyer is aware that it will be a long time after such a criterion is established to the satisfaction of investigators until it will be accepted in the actual administration of justice. The administrators of justice, however, though their business makes them constitutionally conservative, cannot fail eventually to receive and use any truly workable improvement on their present methods.

The readers of this JOURNAL will perhaps wonder why classifications as to mental and emotional condition do not enter more prominently into the influential factors bearing on the likelihood of reform. One explanation for this doubtless is that an accurate classification of that kind is a practical impossibility in view of the equipment at the disposal of a reformatory. The authors, however, definitely state that they believe that mental and emotional states are reflected symptomatically in the other factors which they have chosen, and that an additional factor expressing psychiatric considerations would be misleading, in that such considerations had already been given their due weight through the other factors.

In conclusion Dr. and Mrs. Glueck remind us that while only one-fifth of the inmates of Concord can be said to have reformed, they were 100 per cent failures on arrival. They also remind us of the almost inevitable stereotype into which such institutions crystallize, and they ask us how a warped, defiant, feeble-minded, would-be "big shot" with no good record to defend, thrown with hardened veterans whose skill commands his admiration, can be expected to have his life made over into one of usefulness and sweetness by any institutional wholesale methods. Yet, other methods which could give more individualized attention impose a burden of expense in the form of taxation which heretofore the public has always considered too high a price to pay for the reclamation of human waste, some of which is material which can never be re-conditioned. Personal relationships in dealing with such men are absolutely essential, first to understand them and second to influence them.

One cannot read this careful and thoughtful study without the impression that we must either be satisfied to send back 80 per cent of our young criminals to future crime after a mere detention of months or years, or else reorganize the whole method of dealing with them to an extent which the public has not yet even contemplated, much less approved.

RICHARD F. CLEVELAND.

Le Syndrome Epilepsie. O. CROUZON. (Bibliothèque de Grandes Syndromes.) (*Paris: Gaston Doin & Cie, 1929.*)

The title of this monograph, of a little less than 300 pages, did not suggest at first to the reviewer that Crouzon would treat the subject of convulsive states from a modern point of view. This expectation, however, was not entirely justified. Crouzon apparently deeply enrooted in the older conceptions of epilepsy, could not avoid entirely the influence of the modern progress in this field. The result is that the problem is discussed at one time as a symptom in a variety of conditions and at another as an entity of the so-called epilepsy.

In the first chapter the symptomatology is discussed at length and yet we would prefer that Crouzon refer to his own observations rather than rely upon the reports and records of other workers. In this respect a comparison with the recent work of Wilson (Modern Problems in Neurology) suggests itself. Wilson utilized his personal clinical observations and in this respect his study on convulsive states is excellent. In the description of some of the syndromes Crouzon seems to be very painstaking and careful, in others like myoclonus-epilepsy of Unverricht-Lundborg he only touches the surface and passes on so hastily that one unfamiliar with the symptomatology can hardly form a clear picture of the entity. The same may be said of the narcoleptic attacks. He includes the latter in the group of convulsive states only when they are associated with the so-called epileptic attacks and seems to differentiate them from the so-called narcolepsy as originally described by the elder Westphal, Gélineau and others. The pyknolepsies which properly belong to the group of convulsive states are entirely omitted by Crouzon.

A formidable task under any circumstances is to discuss the etiology of convulsive states. Again as in a number of recent monographs on the same subject we have recapitulations of older and newer conceptions a repetition of guesses and possibilities of the mechanisms and processes responsible for the convulsive attack. The chapter on physio-pathology which is closely related to the previous one contains uncritical reviews of opinions chiefly of the European schools to practically the complete exclusion of the important contributions of the American workers.

The chapter on treatment is the most extensive but filled with countless old prescriptions and long discussions on the efficacy of potassium boro tartrate to which the reviewer cannot subscribe. The ketogenic diet which is of some value in children is entirely omitted.

In appraising a work such as Crouzon's, one realizes more and more how difficult it is for one man to handle all the problems which are involved in the question of convulsive states. Only a collaboration of clinicians, neurophysiologists, anatomists, biochemists and statisticians can produce a comprehensive work on the subject.

Crouzon's monograph, however, is an important contribution for the general practitioner. He will find in it a wealth of useful material, which on account of the simple presentation is easily accessible.

JOHN NOTKIN,
Manhattan State Hospital, New York.